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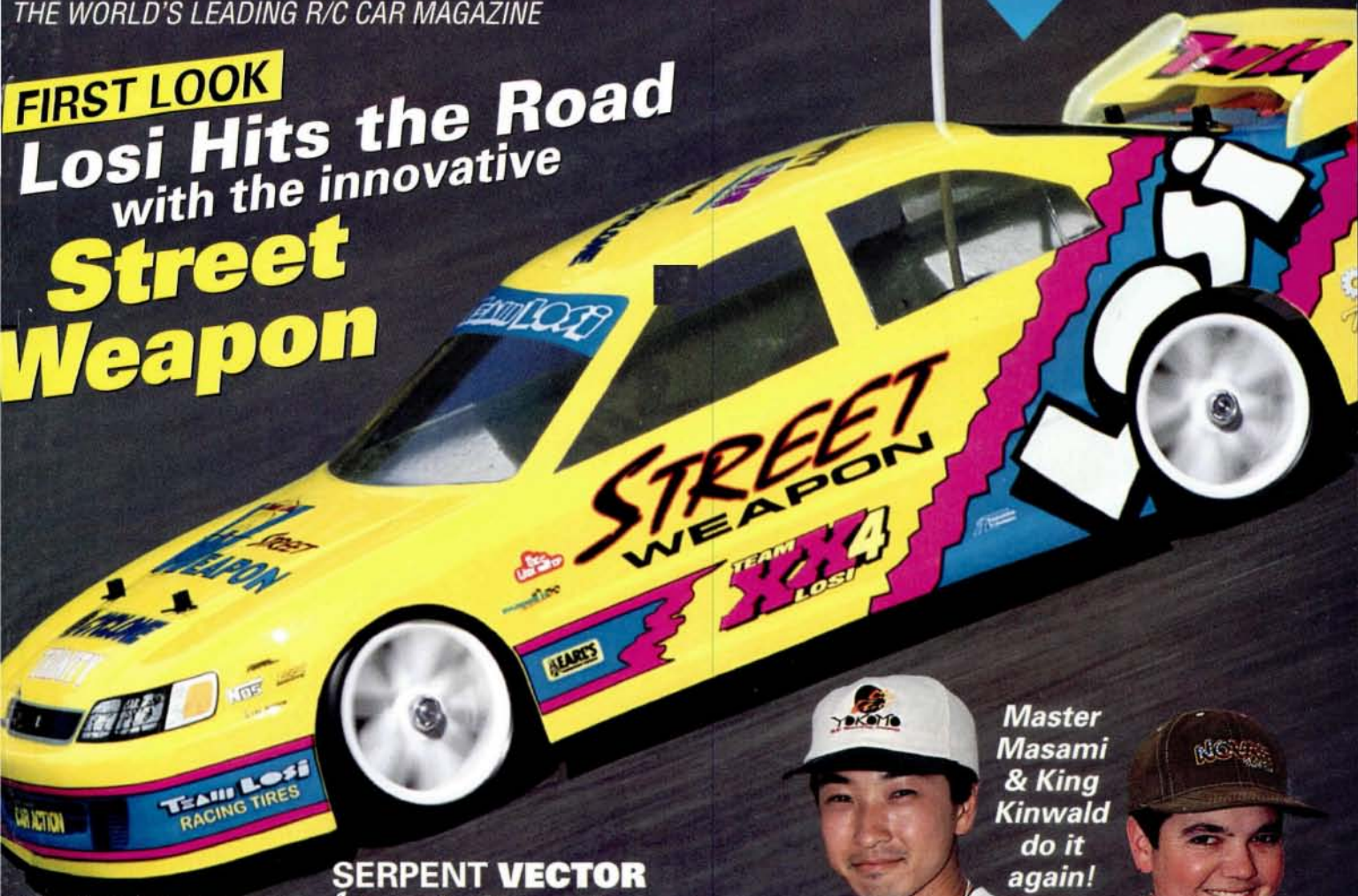
THE WORLD'S LEADING R/C CAR MAGAZINE

FIRST LOOK
Losi Hits the Road with the innovative Street Weapon



SERPENT **VECTOR**
1/8-scale Champion

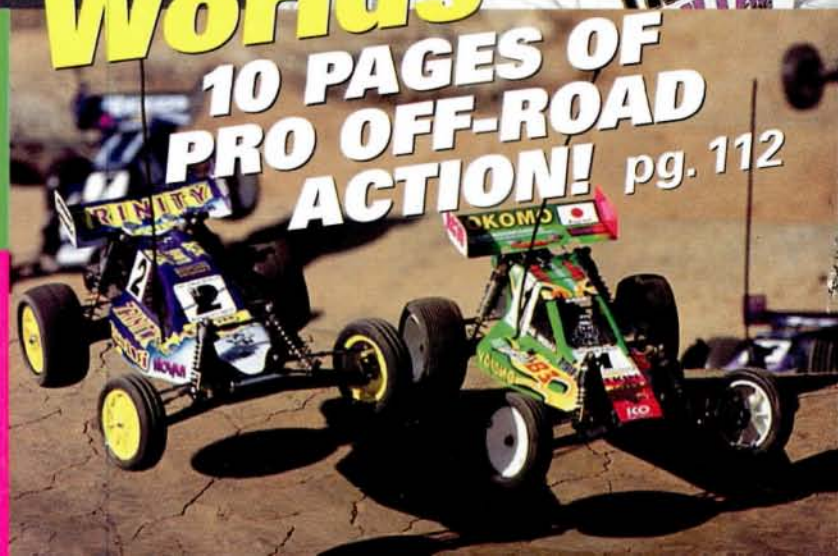
TAMIYA **TL01**
Budget Competitor

FG MODELLSPORT
1/5-SCALE MERCEDES

Master Masami & King Kinwald do it again!

IFMAR Worlds

10 PAGES OF PRO OFF-ROAD ACTION! pg. 112



MOTOR BRUSH GUIDE **70 MODELS**

THE LITTLE SECRET THAT MAKES A HUGE DIFFERENCE Page 145

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Radio Control
CAR ACTION
VOLUME 12, NUMBER 12 • DECEMBER 1997

features

DEPARTMENTS

COLUMNS

THRASH TESTS

ON THE COVER: main image—Team Losi's armored car, the Street Weapon; dirt-slingin' action from the IFMAR Worlds (photos by John Howell).

ON THIS PAGE: top to bottom—action at the IFMAR Off-Road Worlds; a first test of Losi's Street Weapon; FG Modellsport AMG Mercedes; Tamiya's Alfa TL01 (all photos by John Howell); Serpent Vector (photo by Walter Sidas).

World Champion. Numero Uno. Best of the Best.

Can you imagine what it would be like to stroll off the drivers' stand knowing you've just conquered the world? I would love it! Imagine being in the pits, flipping through the pages of *Car Action*, pointing out other racers and psyching out your competitors. "Beat him ... he was slow ..." "Yeah, raced that guy, he ate my dust ..." "This guy's a hack; I won anyway ...."

The IFMAR (International Federation of Model Auto Racing) Off-Road World Championships is arguably the biggest race on the planet. As with every IFMAR event, the Off-Road Worlds is held every two years, and it draws an international roster of competitors who must first qualify as their nation's best, just to get in the door. In addition to the excitement of the very best drivers going at it full steam, another highlight of the Worlds is all the new products and "secret weapons" that the race teams introduce—stuff that (hopefully) we'll all be able to buy, so that *we* can go faster!

This year's seventh running of the Worlds was held in our "backyard" at the famous Ranch Pit Shop in Pomona, CA. Despite the perceived home-court advantage, the racing was anything but one-sided. It was the Europeans in particular who showed everyone that they know how to go fast on American-style tracks. A strong team from Japan, which dominated at the Worlds warm-up race several weeks earlier, also served to nullify any geographical advantage.

Visit the *Car Action* website at http://www.airage.com

Who won? Read our race coverage (which begins on page 112) to learn the answer. I will say, however, that you probably won't be too surprised when you learn the two champs' identities; world championships are seldom won by "flash-in-the-pan" drivers!

■ Quick! What do you know about motor brushes? "Uh, they're the coppery things in my motor that I never change or clean— right?" Well, OK, you are right, but don't you think you should know a little more about brushes than that? Get enlightened with our "Racer's Guide to Brushes": it has all the info you'll need to pick the right brush for the task at hand. As author Peter Vieira says, "It's a pit-box keeper."

Some other features you won't want to miss this month include our first test of Team Losi's new Street Weapon sedan (watch out for this one!), and an ultra-big (1/5 scale) touring car from German manufacturer FG Modellsport (talk about the full spectrum of R/C!). Until next month—ciao!

Frank Masi, Editor-in-Chief
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Radio Control CAR ACTION

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AirAGE
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Give Your Truck the Slip!

My girlfriend just upgraded her racing truck from a Losi JR-T to a Double-XT Sport (with bearings, of course, and yes, I said "my girlfriend"). We sold the JR-T to a friend who was interested in racing. Do you know of any kit that would allow a slipper clutch to be installed on the JR-T? The lack of a slipper was the reason my girlfriend upgraded in the first place. Also, will Associated build a 4WD car to compete with the XX-4; will Losi get into the parking lot scene, as Associated did?
MIKE CORDEAU
Irisburg, VA

Since the JR-T uses the same LRM tranny as the Pro-SE used before the introduction of the Double-X gearbox, the Pro-SE slipper is a simple bolt-on affair (she'll need to replace the tranny's top shaft with a Pro-SE unit, however).

Losi has released a road-going version of the XX-4 called the Street Weapon (see our "First Look" on page 70); however, the car isn't really a competitor for Associated's Dual Sport, since the DS is a 2WD machine. As for the possibility of a 4WD RC10: I don't think it will happen. Associated has a lot of history with Yokomo, and I suspect they'll stick with their 4WD cars. Here's a little R/C footnote to the Associated 4WD story: MIP did make a 4WD conversion for the RC10. It ran well and won some races, as I recall! —George

Future Entrepreneur

I'm looking to get started in R/C racing but I don't think my dad likes the idea; whenever I find a good deal on a truck, he always says, "Do you know how long it takes me to make that kind of money?" However, I estimate he makes about $30,000 a year. If he gives in, what truck do you recommend for $250 or under? Oh yeah, I'm 11 years old.
FAITHFUL FRIEND
in Florida

Hey Faithful, did you know that dear ole dad has to foot the bill for house payments, clothing, car payments, food, and so on? Next time your dad has a couple of extra C-notes, he'll probably spend them to make sure you're fed and clothed. He'd probably prefer to spend it on golf clubs, but hey, he's a responsible guy. Why don't you learn from your pop and be responsible yourself? Make your own money. You live in Florida, right? That's a lush state—try mowing lawns to earn the cash you need. Twenty bucks a lawn, you do three a week, let's see, carry the two—that's 60 dollars a week. After a month, you've got $240 for your first truck. Of course, you could do more lawns in a week and earn even more cash, or you could get a paper route. Or wash the neighbors' cars. Or walk their dogs. To quote Citizen Kane, "There's money lying all around—you just have to know how to pick it up." —Pete

Your Car will be "The Bomb"

Your magazine is "the bomb!" It rules! What would happen if I bought two y-harnesses and connected three 6-cell batteries (one DuraTrax 1400, one DuraTrax 1500 and one Sanyo 1500) to one ESC? Would I blow something up? Also, is there a way to strengthen tie rods, or do I need to buy stronger ones? Thanks for the help, guys.
JAY "WOLFMAN" FISCHER

Funny you should mention the word "bomb," Wolfman, because that is what your car will be if you go through with your triple-battery plan. Unless your ESC is rated to handle 18 cells, you'll soon be smelling the acrid stench of fried insulation. After that, you'll be looking for another speed control. I don't know of any practical way to strengthen tie rods, but I suggest that you upgrade to titanium rods the next time you break a set of standard steel units. —Pete

You Lookin' at Me?

I am interested in buying a radio-controlled car, but I don't know much about them. The fastest thing in this town is a Turbo Thruster from RadioShack, and I have it. Can I upgrade that car? What's the difference between a kit and a combo? I have $300 to spend.
MATT KINLAW
Mount Morris, IL

Matt, I can just see you prowling Mount Morris looking for a race with your Turbo Thruster. "Hey you, Tyco boy! You lookin' at me, punk? I don't care if your car transforms into a robot, I'll still kick your butt!" All right, let's get down to biz. Don't bother trying to upgrade your RadioShack machine. As you have discovered, department store cars will get you started, but that's it. Pass the Turbo Thruster along to a friend and buy a good entry-level machine. You really can't go wrong with anything from companies such as Associated, Losi, Traxxas, Kyosho, Schumacher, MRC, or Tamiya. Just pick the car that suits your style and budget. A "combo" includes the radio gear, a battery and a charger. It may also include paint and other finishing supplies; ask before you buy. Your three bills should get you started very nicely! Have fun, and keep in touch. — Pete

Eric Deline is no Dummy

Your magazine is the best! I have a couple of questions about the Traxxas Rustler. Would the Rustler be good for a beginner on a budget? Should I buy it in ready-to-run form? I know it's better to build the kit myself, but I've never had much luck building stuff, so I thought RTR might be the way to go. If you could help me by answering my questions, I would be very grateful.

And tell Chris that his "Back Lot" is the best. Keep up the good work!
ERIC DELINE
Grayling, MI

Thanks for the kind words, Eric. I heartily recommend the Rustler to you and any other beginner in R/C. It's as rugged as heck, has a great-looking body and handles well. Despite your lack of confidence, I suggest you take a shot at building the kit yourself. I suspect you're skeptical because, like me, you aren't very good at building models and other "artsy-crafty" stuff. R/C cars aren't like that. If you build something incorrectly, you can take it apart and fix it. With the exception of painting the body, no part of the assembly will put you out in the cold if you mess up. I don't think you'll have any problems. I see that you're smart enough to put together a coherent, well-written letter, so I'm sure you will be able to build a Rustler!

And Chris doesn't actually write "Back Lot." He just types a couple of parameters into Microsoft Wiseass, and it shoots out the completed article. —Pete

WRITE TO US! We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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Peter Vieira: peterv@airage.com
Cindy White: cindyw@airgage.com

INSIDE scoop

In search of fun and glory, 'cause life's too short to be a sheep • by Chris Chianelli

Red Sealed Bearings

Everyone wants to go faster. As many of you know—or should know—one of the best performance upgrades you can install in your vehicle—whether it's a car or truck, gas or electric—is to step up from bushings to ball bearings. It's money well spent: end of story. Vehicles equipped with ball bearings simply run smoother, go faster and last longer than bushing-equipped vehicles. One drawback that bearings have, though, is dirt and dust intrusion. These cause performance and bearing life to decrease significantly. Dynamite's new Red Sealed bearings are completely sealed against contamination with bright red Teflon. Red Sealed bearings not only stay cleaner inside, but also keep their lubricating grease in the ball race, where it belongs. And for convenient re-greasing, these bearings feature a removable snap-ring for easy access.

Even though these bearings are a significant improvement over the previous design, I'm told there has been no increase in price: the Red Sealed bearings will have the same economical pricing. Available in both standard (U.S.) and metric sizes, these unique bearings are packaged individually, in pairs, in tubes, and in complete sets for specific R/C vehicles. Contact Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355.

150 for the T2 & T3

Pro-Line has released a '97 Ford F-150 off-road body that's engineered to fit the Associated T2 and new T3 truck. It's made of .030 Lexan and features fast, narrow race-truck body lines. Designed to improve truck performance, the Ford F-150 comes with an add-on rear spoiler. For more information, contact Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

BODY Beautiful

At some point, Protoform will produce a real clunker of a body. Dale Epp will just snap and decide that the world needs a 1/10-scale AMC Pacer; it's bound to happen. The man can't keep creating beautiful body after beautiful body without missing the mark once in a while! Until that day comes, here are two new releases from the aforementioned mold-meister ...

This 1998 Boxter S Coupe looks like just the ticket for the hi-lux set. Park your 190mm 4WD or FWD sedan under this shell and cruise in style! Of course, it is a Protoform body, so performance doesn't take a back seat; an add-on wing helps keep your machine glued to the ground. To ensure that you get results as spectacular as those shown in this photo, window masks are included, as is a decal sheet.

Like to go fast, turn left and look good? Saddle up your superspeedway machine with this new, ultra-slippery Ford Taurus SS body. You can get it in regular and "lite" versions; both include an add-on spoiler and window masks. Protoform says the Taurus strikes a good balance between high downforce and low drag; sounds fast to me!

Contact Protoform, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

INSIDE scoop

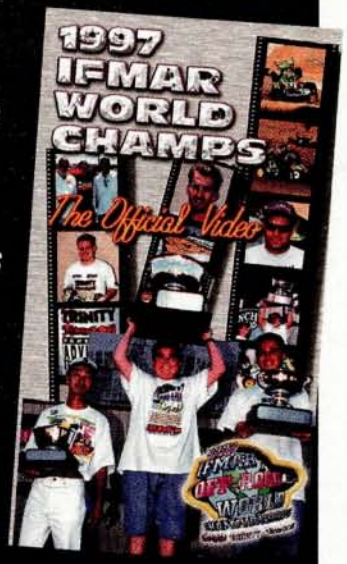
The new nitro-powered OFNA Ferrari 310B Formula I racer is built around a flat aluminum T-bar chassis with ball-diff-equipped solid axle. The front suspension uses coil springs for damping, and the rear pod relies on traditional damper disks to smooth out slight road imperfections. The car comes completely assembled with a pull-start-equipped Force .12 engine mounted on the motor pod. It also includes rubber slick tires with foam inserts and the Ferrari 310B body shown here. For more information, contact OFNA, 22600 D Lambert, Ste. 1009, Lake Forest, CA 92630; (714) 586-2910; fax (714) 586-8812.

Formula Nitro

JR R-1
Shape of things to come?

With the placement of its large LCD screen and neutral balance of its inline trigger/wheel placement, does JR Propo's new R-1 represent the shape of things to come? Only time will tell, and so will we here at *Car Action* as soon as we get one to test. Until then, I can tell you this promising radio features:10-model memory capability, 8-character model-naming on-screen display, digital trims that require no readjustment when you switch from car to car, steering-speed limiter and output module options of FM, ZPCM and SPCM. Stay tuned; we'll have more on this late-breaking hot item—lots more! JR; distributed by Horizon Hobby Distributors, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355.

Trinity/Losi Produce *IFMAR Off-Road Worlds Video*



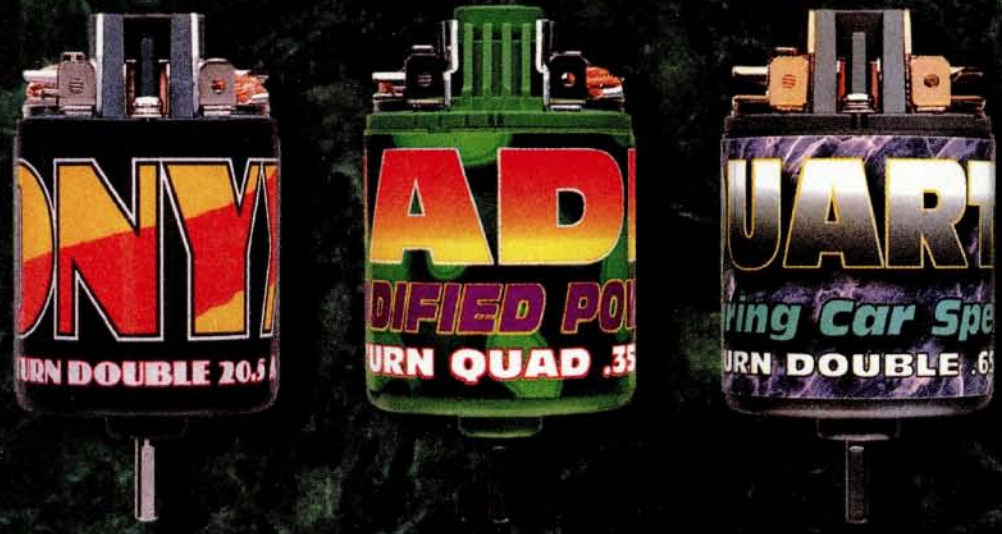
Racing fans who weren't able to make it to the recent IFMAR Off-Road Worlds will be able to catch on video all the action they missed. Trinity and Team Losi have commissioned Pete Schneider and Comm-Video to produce the official video of the 1997 IFMAR Off-Road Worlds. Held at the Ranch Pit Shop in Pomona, CA, it was a huge off-road showdown that featured the best drivers from around the world. By the time you read this, the video should be available in U.S. and European PAL format. The tapes are available in U.S. format for $23.99, and in European format for $25.99. Contact Trinity at 1901 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.

Ultra *Convenience,* ***Ultra****-Glow*

Until now, to start engines without pull-starters, both a starter box with a charged battery and a charged ni-starter were needed. To simplify things, Dynamite announces the Ultra-Glow. This glow-plug driver is attached directly to your starter box and draws power from the starter battery. An added bonus to this convenience is an LED light on the Ultra-Glow that indicates whether the attached glow plug is good. The Ultra-Glow has an auto-adjust feature for different types of plugs and can also be used to compensate for an overly rich mixture that might make starting difficult. It can be run from a 12V pack, or a two 6V-pack system such as the Dynamite Ultra-Start starter box. In fact, the Ultra-Start has a hole already in place for the Ultra-Glow LED indicator, and mounting holes for the unit are clearly marked on the starter box to make installation even easier.

Contact Horizon Hobby Distributors Inc., 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 352-0355.

Rare Examples Of Performance And Economy.



Speed Gems machine wound modified motors are an excellent alternative for a racer on a budget. Constructed with the same superior quality components as our expensive modified motors, they have a machine wound armature. This combination produces an extremely fast motor at about half the cost of a hand wound. Only $49.99 list. For a rare combination of performance and economy, acquire a Speed Gem today.

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Facsimile (908) 862-6875

Xipp for Extra Zap

Xipp (pronounced "zip") has developed a new line of modified racing motors based on the latest Yokomo and Epic technology. According to the manufacturer, these motors were designed to take advantage of today's high-current battery technology, but they'll also work with standard cells. The motors feature hand-wound and epoxied armatures with hand-welded commutator tabs. All armatures are diamond trued and precision balanced, and all motor magnets are gauss tested to make sure they meet specs. The armatures are magnetically centered within the motor can for peak torque and efficiency. After assembly, the motors are tested, and timing is optimized for maximum power and efficiency. Dyno-tuned stock motors are also available. For more information, contact Xipp at 4201 Church Rd., #265, Mt. Laurel, NJ 08054; (609) 778-XIPP; fax (609) 778-9497.

LATE-BREAKING NEWS FLASH!!

Hobby Shack's New TLO1 Class

West Coast editor George Gonzalez reports that Fountain Valley, CA-based retail chain Hobby Shack has expanded its successful parking-lot racing program by adding a new Tamiya TL01 4WD class. In my opinion, this is a good move for the industry and enthusiasts. The TLO1 is an inexpensive, brilliantly simple design that, according to very reliable sources, out-handles the more expensive TAO2. Hobby Shack's plans to promote the class are definite, so expect to hear more. For more information, contact Hobby Shack, 18480 Bandilier Cir., Fountain Valley, CA 92728-8610; (714) 964-0827; fax (714) 962-6452.

Carrera **M101**

Don't have any technical information or possible release dates on this one yet, but I thought you guys would like to have a look, anyway. It's a new M-scale pan chassis from ABC Hobby that will be distributed in the U.S. by GHI and Sunrise; Canadian distribution will be by Joylite Mfg. When we find out more, we'll let you know ....

*Light, Low & **Sleek***

According to Dahm's Racing Bodies, their new Toyminator XXT3 body is the lightest, lowest and most aerodynamic off-road race-truck body available. The Toyminator XXT3's extended-cab body is molded to fit Associated's RC10T3, RC10T2, RC10T, Losi Double-XT 'CR' and Double-XT and the Tamiya Stadium Blizter like a glove. It uses stock mounts and can be attached to the frame sides with Velcro®-brand fastener. 3D side panels can be shaped to match frame contours for increased aerodynamics and to keep out dirt. Formed of the highest quality G.E. Lexan, the body is available in both lightweight .030 and extra-strong .040 Lexan. For more info, contact Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931; (707) 792-1316; fax (707) 792-0137.

READERS' rides SPONSORED BY NOVAK ELECTRONICS, INC. RACING TEAM

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the seventh annual "Readers' Rides of the Year Contest" in the fall of 1997. The winner will be awarded $500 and an assortment of electronic R/C equipment furnished by Novak Electronics Inc. Our second and third choices will also receive an assortment of Novak electronic R/C equipment. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!

ARABIAN R/C

Straight from Dubai in the United Arab Emirates, Samaj Angolkar sent us photos of all his family's R/C cars. Pictured here is his mother's Kyosho Big Boss M/T that he tells us is basically stock except for ball bearings and a custom-built wheelie-bar. The Big Boss is powered by a Trinity Onyx motor and a Novak Rooster ESC and sports a custom paint job on its 1/8-scale VW Beetle body.

BLAZING (DUAL-PURPOSE) INFERNO

Doug Morrow of Harrisburg, NC, sent us a picture of his first R/C car—Kyosho's Inferno 10 with an O.S. 12 CZ-Z engine. He tells us that he detailed it with a polished chassis, radio plate, shock towers and modifications that include front and rear universal swing shafts, gold shocks, Losi retainers and springs, a 3-shoe clutch, ultralight clutchbell and a full set of ball bearings. Doug also equipped it with Pro-Line step-pin dirt (for off-road) and Road Hawg II (on-road) tires, HPI 5-Star wheels, a Futaba 2PBKA radio system and S148 servos. Looks as if he has touched on every detail to make his first car a winner on- and off-road.

AUTOBAHN JOYRIDE

Marcel Bilow of Leopoldshöhe, Germany, sent us this photo of his homebuilt "funny car" that has maxed out at 117km/hr—that's 72.7mph (for those of us who haven't yet converted to metrics), and THAT'S pretty darned fast for a homebuilt car! The chassis was crafted from fiberglass, to which Marcel added a 9x3 Trinity motor and Yokomo 2-speed tranny. Marcel airbrushed the Protoform funny-car body himself for an "unbeatable" look!

DAD'S DELIGHT

Steve Cozart of Austin, TX, gave up racing when his first child was born. Shortly after the birth of his second child, he returned to the hobby. For Christmas, he received this HPI RS4, which he equipped with bearings, Sanyo 2000 cells, a Trinity Speedworks quartz motor, a Tekin Rebel ESC, his Futaba Magnum Jr. radio (left over from the old days) and HPI V-groove radials with RPM Vortex chrome wheels with knockoff nuts. Come race time, Steve replaces this HPI Porsche 911 GT1 body with one that's become slightly more beaten up after turning cartwheels and smacking corner markers at nighttime races.

READERS' rides

HAWAIIAN HOLIDAY

These two great-looking rides were sent to us by Ted Nguyen of Waipahu, HI. The "Jurassic Park" Associated RC10GT rides on Pro-Line Road Hawg tires and is equipped with titanium turnbuckles and an HPI .15 Nitro Star engine. The great-looking Tamiya TGX wears the Porsche body with style and runs completely stock with the addition of racing slicks. If these concours-winning cars are as quick as they are hot, then Ted must clean up at both concours events and A-mains!

MEAN, GREEN RACING MACHINES

Eric Reid of Pittsburgh, NH, sent us this photo of his Traxxas Rustler truck and Associated RC10B2 buggy. The Rustler runs with a stock Trinity Midnight motor, and the RC10B2 is powered by a stock Black Night motor. Eric races both vehicles on a track that he and his father have constructed on their property.

ALL-AROUND ATTENTION GRABBER

Worried that we weren't getting enough photos of NASCAR-type cars for "Readers' Rides," Stan Yedlowski of Woodlynne, NJ, sent us a picture of his Team Associated RC10LSO. Stan has equipped his powerful oval master with an IRS rear axle set, a Tekin 411-G2 speed control and Sanyo 1700 cells. Whenever he's on the winners' stand at local races with South Jersey's Cost-Controlled Racing Series, the seven-color custom paint job on the Pontiac Grand Prix body grabs all the attention.

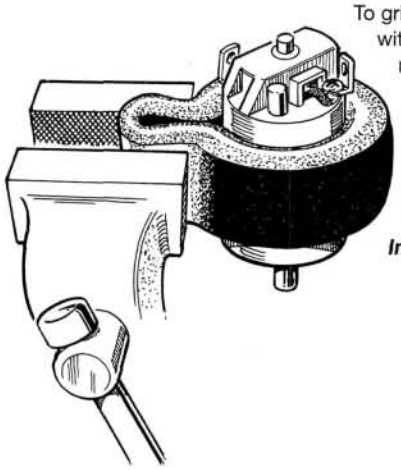
BROTHERLY COMPETITION

These two stylish touring cars belong to Rob and Richard Hibbs of Whitby, Ontario, Canada. Rob's Audi A4 is based around a Tamiya TA02 with an HPI graphite chassis and has a full set of tuned springs, custom-made front and rear swaybars, a Skyline Speed Tuned gear set, HPI 7-spoke wheels and V-groove tires, a full set of adjustable camber links, full ball bearings and a Yokomo 14-turn modified motor. He controls it with an Airtronics Rival Sport radio and delivers power to the car with a Tekin Speed Star speed control. Richard's Volvo 850 is basically a box stock Tamiya FWD chassis with ball bearings and a Trinity Midnight motor. The car is controlled by a Futaba Magnum Sport radio and reversing ESC. The brothers duel it out at the racetrack and on a roadcourse that they set up on the street near their house—don't you try that at home!

PIT TIPS

by Jim Newman

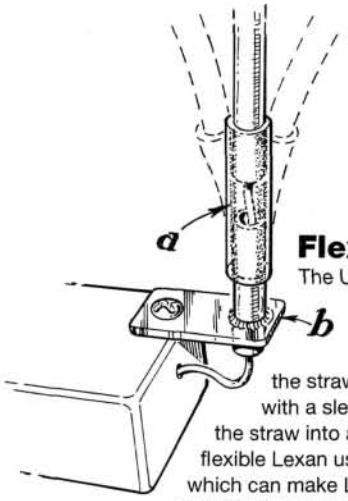
Pinch Hit



To grip a motor in a vise without distorting the motor can, slip it into an old tire, then pinch the excess rubber in the vise jaws as shown.

DAVID SIMS, Indianapolis, IN

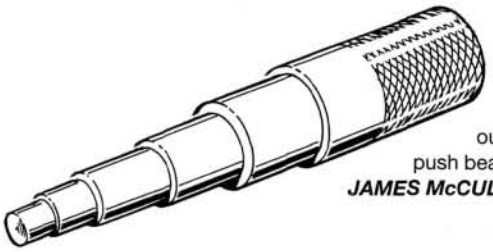
Flexi-Straw



The Ultima antenna mount is molded into the receiver case and often snaps off because of the rigid antenna straw. Cut the straw near the bottom, then rejoin it with a sleeve of rubber fuel line (a). Glue the straw into a new mount (b) made from flexible Lexan using Goo or PFM. Avoid CA, which can make Lexan brittle.

KEVIN MACLAGGER, Valatie, NY

Bearing Pusher



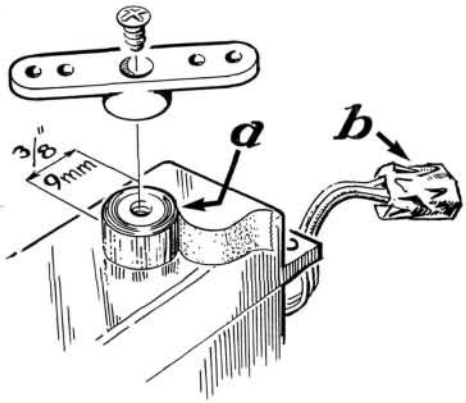
This stepped tool is turned out of aluminum and fits every bearing in our contributor's car. It allows him to push bearings in and out without damage.

JAMES McCULLOUGH Jr., Grand Prairie, TX

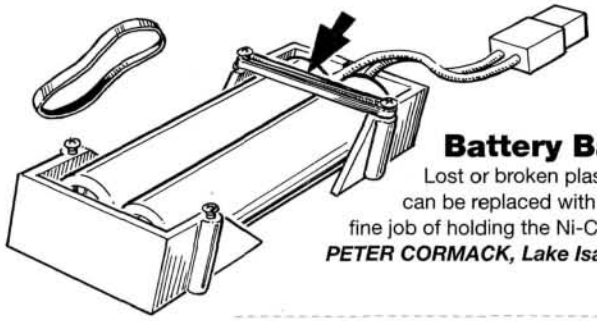
Dip It

To make your servo highly water-resistant, first remove the servo arm, then wind masking tape around the output shaft as shown (a), covering the top of the shaft with a small patch. Wrap the plug (b) tightly in foil then dip the whole thing in Plastic Dip (it's used to rubberize handles).

ARIBERTO GALANTE, Longueuil, Quebec, Canada



Battery Band-It



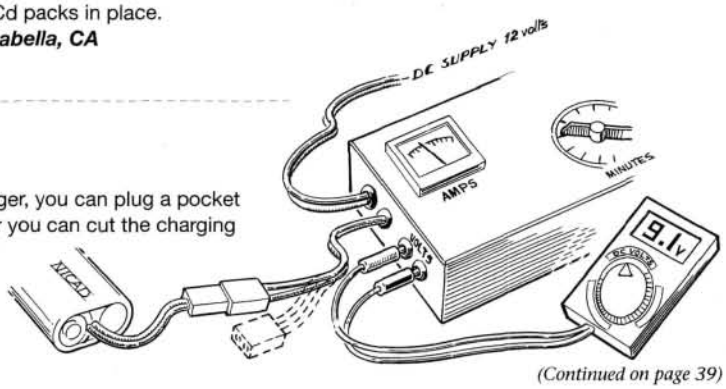
Lost or broken plastic battery-retainer bars can be replaced with rubber bands; these do a fine job of holding the Ni-Cd packs in place.

PETER CORMACK, Lake Isabella, CA

Peak on the Cheap

If you use an inexpensive, non-peaking charger, you can plug a pocket digital voltmeter into the sockets or posts, or you can cut the charging lead and solder in an extra socket (shown in dashed line), then plug the meter into that. When you see the voltage reading begin to fall, you know the Ni-Cd pack has peaked.

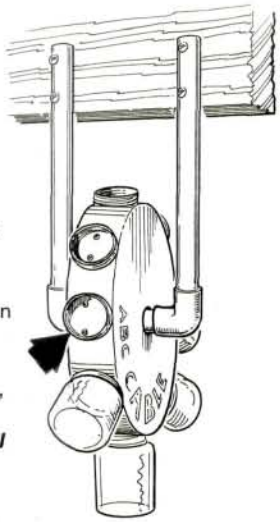
ZACHARY CARLSON, Lee, IL



(Continued on page 39)

PIT TIPS

(Continued from page 36)



Reel In Your Parts

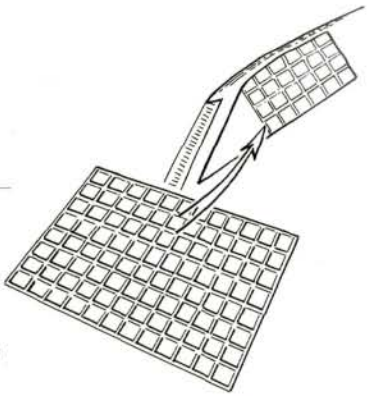
Cut the flanges from an old cable reel, mount it on a hanger made from glued-together PVC pipe, then attach it to the overhead beams. Screw your jar lids to this neat hanging wheel so that spares, etc., are easily reached.

JOEY WESTLAKE, Tecumseh, MI

EZ Change

Make quick changes on your receiver by slotting the side of the antenna mount with a Dremel tool. Now lift out the receiver complete with its own antenna straw—no rethreading of the wire.

TAI BLECHTA, Keaav, HI



In the Net

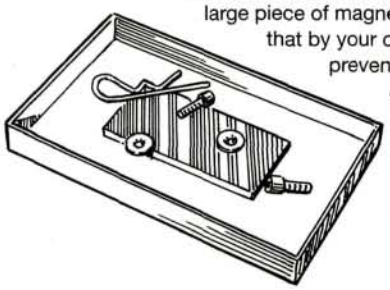
This plastic embroidery net from the craft store can be spray-painted, cut and glued into your car's side windows for a convincing safety net.

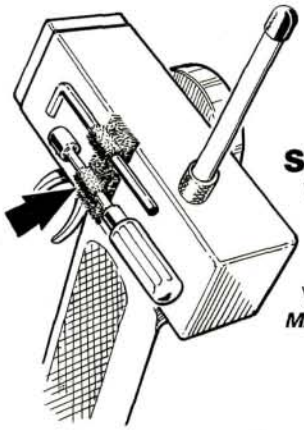
BRADLEY SINCLAIR, Manotick, Ontario, Canada

Mag Tray

To keep screws and other small parts from being lost in the dirt, glue a large piece of magnetic strip into the bottom of a shoebox lid then "pit" that by your car. Hot-glue a scrap of plywood onto the bottom to prevent the lid from blowing over.

JUSTIN TSE, Lexington, MA

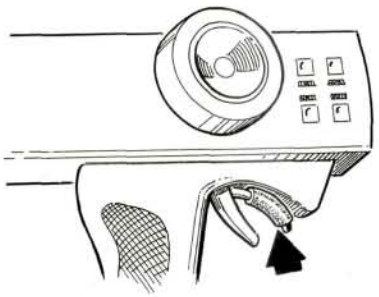




Stuck Up

Wrap a piece of fuzzy Velcro®-brand fastener around your most often used tools then attach them to the back of the transmitter with a strip of mating Velcro®.

MATT COLLINS, Baltimore, MD



Trigger Happy

You can make a better fit on your radio trigger for your skinny index finger if you slip a piece of thick-walled rubber tubing over the forward (brake) trigger.

CHRIS CHRISTOPOULUS, Athens, Greece

Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.

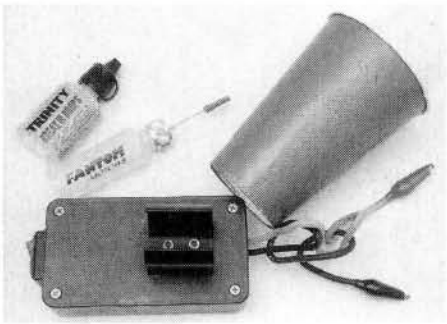
R/C DOCTOR

by Doug Mertes

Get increased horsepower from closed-endbell motors

These new Mabuchi and Johnson motors are very consistent from unit to unit. No need to buy a bunch of them to find a fast one!

FOR YEARS, HOBBYISTS who considered themselves "serious" stock-class racers shunned sealed motors, such as the Mabuchi and Johnson brand units that were included as original equipment in Tamiya kits. These closed endbell motors, although long-lasting and easy on battery packs, were considered too wimpy and weak by the go-fast crowd. Parking-lot racing's resurgence in popularity, however, has produced an equivalent desire to dig those dusty old motors out of the closet and put them back into service. Many local outdoor race series mandate 540 motors for their spec-class competitors, and of course, Tamiya's TCS series has motivated racers all over the country to start taking these "old-tech" powerplants more seriously.



All you need to make your motor run faster is a cup of water, a 4-cell battery pack and some comm drops. Both the Fantom and Trinity drops produced the same result.

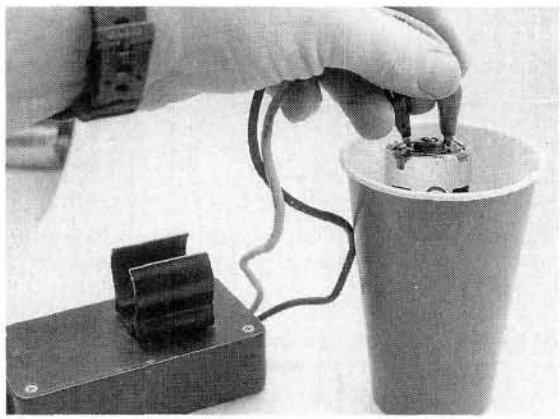
I've had more than a little experience with these sealed motors, because I've raced in the TCS series six times since its inception in 1994; our local club also used them as its spec-class F1 motor last year. Still, when the latest Tamiya Championship Series event came to Laurel, MD, in July, I found myself with some really old, really sloppy, really slow motors. I was actually surprised to discover that these motors could be purchased individually, because I'd never before seen one outside of a kit. I just saved the ones that came with the various Tamiya kits I had built over the years, so some of my older spinners were eight or nine years old. You may have to look for a while to locate a new motor (try hobby shops that sponsor parking-lot series), but they're available under Tamiya's part no. 7435044.

Of course, once I got my hands on six new motors, I had to dyno them, right? I was curious to see how much more power they would have in comparison with the old ones, and I was also curious to see how much variation in power there would be from one motor to the next.

THE DYNO EXPERIENCE: PART I

To establish a base line for comparison purposes, I cleaned and then dyno'd the old motors on my LAVCo Pro dynamometer. With an average 20A power reading of 255 at 9,800rpm and a 25A power number of 280 at 8,500rpm, it was no wonder that my lap times were starting to decline! After I knew how bad the news was, I started to lube and dyno the new motors. Five of them were Mabuchi-brand 540s, but one was a rare Johnson motor with a chrome-plated can. Legend has it that the Johnson is a slightly more powerful unit that produces higher rpm, but we'll let Mr. Dyno tell us the real deal.

I wasn't that surprised to find that all the new motors put out better numbers than the old dogs from my motor box, but I was floored by the consistency they displayed. None of the new motors varied by more than a few power numbers or a couple of hundred rpm at either of the two lower-amp-draw settings (because of the low-amp draw of these motors, readings higher than 25 amps are irrelevant). All of the motors ran about 285/11,300 at 20 amps, and 302/9,600 at 25 amps. These numbers represent an appreciable boost in both power output and shaft speed over the older units.

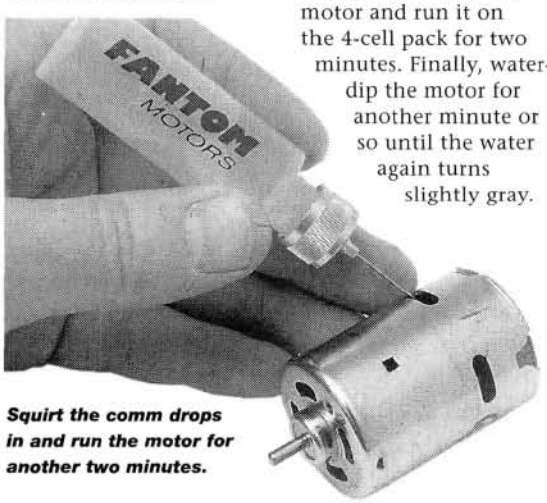


Immerse the spinning motor in the water until it turns gray. Ick—don't drink it!

BUT WAIT! THERE'S MORE!

Of course, those who read this column regularly know that I couldn't possibly be satisfied with power levels that come right out of the box! I referred to my racing notebook from the late '80s for tips on how to increase power and rpm levels with these older motors (I knew there was a reason for me to keep those old spiral notebooks around!). I did a little experimenting down in the secret underground laboratory and came up with a sure-fire way to legally increase those power numbers by 25, and at the same time increase rpm by about 1,100 at both readings. Now, that's a power jump!

I started with that old racer's secret: the water dip. This is a way to break in the super-hard brushes used in 540 cans without wearing out the soft copper commutator. You can pull the brushes from an open-endbell motor and shape them in a motorized tool and

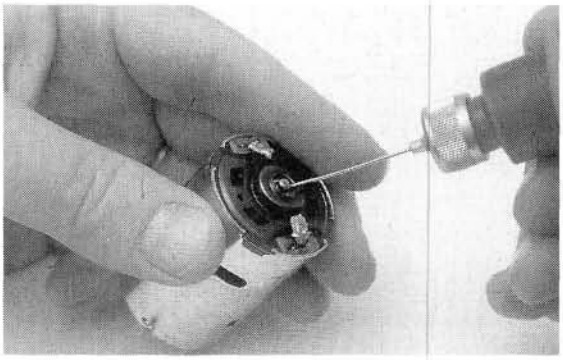


Squirt the comm drops in and run the motor for another two minutes.

even cut the comm if it starts to wear, but neither of those options applies to a sealed motor. Simply take a clean, medium-size plastic or paper cup and fill it with cool tap water. Now, hook up your Dooleybox or other 4-cell battery pack to the motor and immerse the motor in the water (battery power only! Never, never, NEVER do this with any sort of AC power supply!). Because electricity takes the path of least resistance, the motor won't short out or burn up, despite the H_2O plunge. Water has greater electrical resistance than copper, so the juice goes from the brushes to the comm, not into the water. After the motor has run submerged for a minute or two, the water will turn gray. Pull the motor out of the water, run it for another 20 seconds or so, and you've finished. Some people tell you to flush out the motor with spray cleaner, but I just run mine until it's pretty dry, then relube the bushings. This results in modest increases in power and rpm, but not enough to be considered a real performance advantage.

Next, squirt a few comm drops onto the commutator, spin the motor and run it on the 4-cell pack for two minutes. Finally, water-dip the motor for another minute or so until the water again turns slightly gray.

Let the motor dry, re-oil the bushings, and you're back in business I headed back to the dyno to see what kind of numbers the dyno would



After you repeat the water-dipping process, dry the motor and re-oil the bushings. You're ready to go!

cough up this time.

I knew that something was up when I re-dyno'd the motors after "the dip." How about an increased 20A reading of 312/12,400, and a 25A reading of 325/10,600? Yeow! What a difference! I proceeded to dip, squirt and re-dip each of the six new powerplants, all of which had similar power and rpm increases (no, the Johnson wasn't any faster than the Mabuchi motors). I tried Trinity* comm drops—both the yellow and blue varieties—and the Fantom* drops, and they both resulted in an increase in performance.

WHAT DOES THIS TELL US?

In all honesty, this experimentation wasn't done "in a vacuum." Water dipping is an old trick from the '80s, and comm drops are certainly nothing new. In all my years of racing, however, I'd never seen a serious effort to increase the power from sealed motors, nor had I ever tried the combination of dippin' and squirtin'. Since this stuff is all legal, I expect everyone who races and reads this article to wind up trying the technique I've outlined. That means that next year, you'll all be faster, even though everyone has to use the same motors. Isn't that supposed to be part of the fun?

** Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

TROUBLE SHOOTING

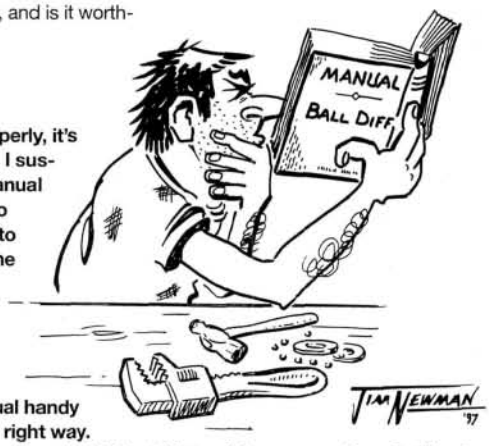
by Doug Mertes

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, *and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting,* Radio Control Car Action, *100 East Ridge, Ridgefield CT 06877-4606. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.*

Slip Sliding Away

I own a Tamiya Porsche 911 and the diff keeps loosening as I drive. I have a Tekin Formula 10 speed control, Airtronics radio equipment, and a 14-turn Trinity T-Tech modified motor. My problems began when I loosened the ball diff just a bit; now, after just 2 minutes of running, the front wheels spin and the car won't move. What gives, and how can I solve this problem? I'd also like to upgrade to Deans 2-pin Ultra connectors or Lite Speed plugs. Which are better, and is it worthwhile to upgrade from the stock connectors? Please help!

WILL HUSSONG
Bethesda MD



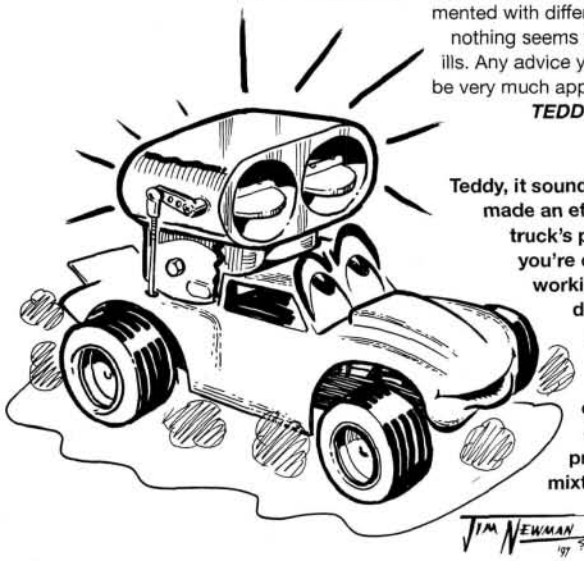
Will, those Tamiya ball diffs are virtually goof-proof. Once put together properly, it's almost impossible to mess them up to the point at which they won't work. I suspect that you've made a basic mistake. When you first built the car, the manual was laid out in front of you and it was easy to follow each assembly step to make sure everything was in the proper place. When you took the diff out to loosen it, however, I bet that you just pulled everything apart, worked on the diff and then replaced it in the gear housing ... backwards! That's right; when the diff is installed backwards, it will still fit into the housing, and it will match up pretty well with the drive gear, but that rascal will loosen up every time since it's rotating in the opposite direction. The Trinity 14-turn motor spins pretty quickly, too, and that means that it will loosen things up very quickly. The next time you take your gearbox apart, have the manual handy and check the illustrations to make sure that the diff assembly goes in the right way. While it's possible that the slippage has damaged the balls and rings, you can probably just tighten things up again and still get pretty good diff action. If it's gritty, buy new balls and flip the rings.

Upgrading to aftermarket plugs will reduce voltage loss caused by resistance in the standard Tamiya plugs. Both Deans and Lite Speed/Sermos plugs are good choices since their construction makes it virtually impossible to reverse polarity and damage your electronics. Rather than recommend one brand over the other, I suggest that you find out which brand is carried by your local hobby shop, and use the ones that you can find most easily. They both work very well.

Troublesome Hawk

I have a problem with my Traxxas Nitro Hawk: it doesn't always want to run! To keep it from dying, I've tried setting the idle speed higher, but that doesn't always work. At other times, the regular idle speed works just fine. Often, the truck will stall when I bring it to a stop, no matter where the idle speed is set. I tried to fix the problem by switching to different fuel (20-percent nitro mix). Then I changed all of the needle valves. Finally, I replaced the entire carb! I've also experimented with different glow plugs, but nothing seems to cure my motor's ills. Any advice you can give me will be very much appreciated!

TEDDY GARCIA



Teddy, it sounds as if you've really made an effort to solve your truck's problem, and I think you're on the right track in working on the fuel-delivery system. As you know, nitro-powered engines require a mixture of fuel and air in order to operate properly, and that mixture needs to be (more or less) within the correct proportions for the motor to run at all. When an engine runs too rich, it blubbers and throws excess fuel out of the exhaust pipe; but when it's too lean, it runs hot, idles poorly and dies unexpectedly. Your problem is that the engine runs fine at times, but won't even idle at other times. Sounds to me like things are kind of lean!

Start by looking closely at the fuel-delivery system, specifically at the fuel lines and filter (you run an in-line fuel filter, don't you?). Pull the lines off one at a time and check them for air leaks, or buy a few feet of high-quality silicone fuel tubing and simply replace them. Sometimes, a line will have an air leak or a small split right where it's stretched over the metal nipple, and you won't see it unless you look very carefully. If the lines check out and replacing the in-line filter doesn't solve the problem, check the pressure line and fitting. Sometimes, the pressure fitting from the pipe will be clogged; check it by putting your finger over it with the engine running, or push a small piece of stiff wire through the fitting to clear it and replace the line.

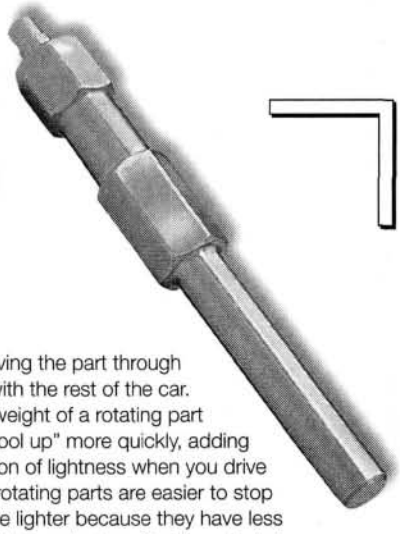
If things still aren't right, you may have an air leak around the base of the cylinder where it meets the case, where the crank exits the case through the bearing, or at the cylinder head. To check this, smear some really thick axle grease around these areas one at a time, and see if that seals the leak and solves the problem temporarily. If it does, you can fix it with a dab of epoxy on the case or by using a new bearing seal. Once you have fixed the air leak, I'm sure you'll see a dramatic improvement in the performance of your motor! ■

PRODUCT WATCH

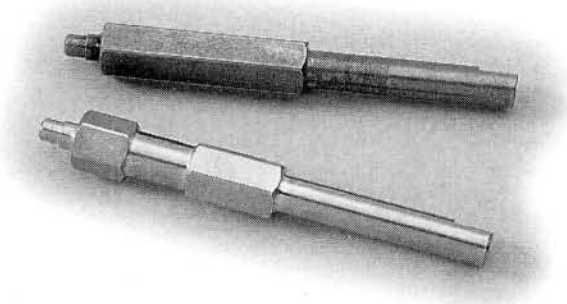
Need to know what's new? What works well and what doesn't? This section is devoted to objective reviews of all R/C car accessory items. From gears and wrenches to motor brushes and shock springs; if you can use it with your R/C vehicle, you'll find it critiqued on these pages.

TAMIYA TA03 Aluminum Counter Shaft

GET THE SHAFT



TAMIYA* RECENTLY released lightweight aluminum counter shafts for the TA03F, F-Pro and R-S models (PN OP-274). The units are sold individually and are expertly machined from aircraft-quality aluminum. The aluminum counter shafts are designed to reduce weight in one of the most critical areas of the chassis—the gearbox. Since the counter shafts rotate at high rpm, reducing weight in this area reduces rotating mass.



The stock, steel counter shaft on the top and the optional lightweight aluminum counter shaft on the bottom. Even at a glance, you can tell which is lighter.

TIPPING THE SCALES

Just how much weight can you expect to reduce? We weighed the stock, steel counter shaft on a high-quality digital scale and it topped out at a whopping 15 grams. We then weighed the Tamiya aluminum counter shaft and found that it weighs only 6 grams. That's nearly a 60-percent reduction in weight. Saving 9 grams may not seem like a lot to the average racer but, again, it's not how much weight you save, it's where the weight is saved. Reducing 9 grams of rotating mass is like removing 18 grams of static weight on the chassis. How can that be? The answer is inertia; an object at rest tends to stay at rest, an object in motion tends to stay in motion. With rotating parts, the motor must overcome inertia to get the part spinning, in addition to moving the part through space, along with the rest of the car. Reducing the weight of a rotating part allows it to "spool up" more quickly, adding to the perception of lightness when you drive the car. Also, rotating parts are easier to stop as they become lighter because they have less inertia to keep them spinning. So, if you install a lightweight aluminum counter shaft in both gearboxes, you'll shave off 18 grams of rotating mass, which offers the same benefits as reducing 36 grams of static weight. Hey, that's nearly an ounce and a half!

WHERE DO I INSTALL IT?

The TA03 has two identical gearboxes at each end. With that in mind, should you replace both stock, steel countershafts or just one? If you replace only one, the drive train will still benefit from a reduction in rotating mass, but replacing both will provide the full effect, so to speak, and the results will most certainly be noticeable at the track.

WRAPPING IT UP

The best part of Tamiya's aluminum counter shafts is that once they're installed, you can't see them. You'll surprise your racing buddies when your car outaccelerates, achieves greater top speed and stops quicker than your buddy's TA03F. Hey, I can keep a secret; can you? *—George M. Gonzalez*

As you can see, the Tamiya aluminum counter shaft weighs in at a super-low 6 grams. If you want your car to start and stop faster, install these bad boys in your gearboxes.

PHOTOS BY WALTER SIDAS

KAWADA Bearing Cleaning Case

GIVE 'EM A BATH

The Kawada Bearing Cleaning Case: simple, effective, portable and inexpensive—four words I like to hear!

KAWADA'S* Bearing Cleaning Case (part no. SK-18; $10.95) is one of those tools that you think you don't need, but when you have one, you'll wonder how you ever got along without it.

WHAT DOES IT DO?

As the name implies, the case was designed to clean bearings, but it won't take you long, however, to discover that it can also be used to clean many other R/C car components. Diff gears, diff balls, thrust-bearing assemblies and just about any other small item can benefit from the Kawada Bearing Cleaning Case.

PHOTOS BY GEORGE M. GONZALEZ

HOW DOES IT WORK?

You clean the bearings by giving them a bath in a solvent. The cleaning case has three components: the plastic bottle, which is a little larger than a motor case; a screened element, which fits inside the case; and an airtight lid. You simply place the screened element inside the bottle then toss in your bearings or other items that need a thorough cleaning. Next, spray some electric motor cleaner into the bottle, and seal the lid (of course, if you wish, you can spray the motor cleaner first, then toss in your bearings). Shake the bottle gently to release dirt, grease and any other fine particles that are trapped inside the bearings. You'll need to soak especially greasy items like diff balls and thrust-bearing assemblies in the solvent for a few minutes. When you lift the screened element, all the dirt, grease and small particles will remain at the bottom of the bottle, and you simply wipe off and re-lube your R/C components.

WHAT KIND OF SOLVENTS CAN I USE?

Electric motor spray, turpentine and denatured alcohol are the solvents of choice; however, keep in mind that motor spray and turpentine should be handled with care: wear plastic gloves. You can also use Simple Green or some other heavy-duty household cleaner to clean small plastic parts (you can't use the case to clean larger parts because it isn't very big). Whatever you do, do not use gasoline. It will damage the plastic case and is a poor solvent because it contains petroleum. It's also highly flammable, so use caution and stay safe!

—George M. Gonzalez

KIMBROUGH Body to Wing Mount

A BETTER WAY TO ATTACH YOUR WING

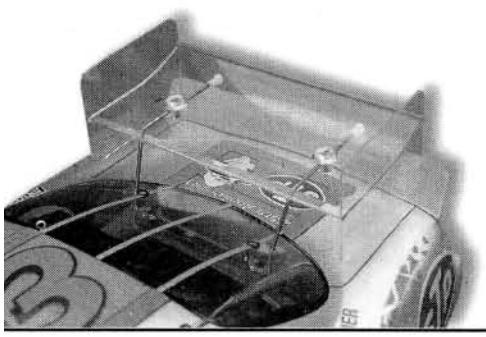
DOES YOUR oval-track car have handling problems on that big outdoor track? When I first started to race at large outdoor ovals, I not only had trouble getting traction at the rear wheels, but I also had to contend with the wind. You can't control the weather, but you can work around it! With this new body to wing mount (no. 139), Kimbrough* has combined form and function for better handling and more control.

The idea behind this design is ingenious. With my previous wing kit, the wing was mounted on the rear motor pod. The piano-wire wing mount extended upwards through the body and was angled toward the back of the car. This wasn't a bad design, but it was a hassle to remove whenever I wanted to work on the chassis. Bolting on the wing was just one more thing to deal with before every race—a real drag when in a hurry. Kimbrough's design has the wing bolted directly to the body, eliminating the hassle of an independent wing mount. The package includes .078-inch piano wire, hardware and mounting brackets.

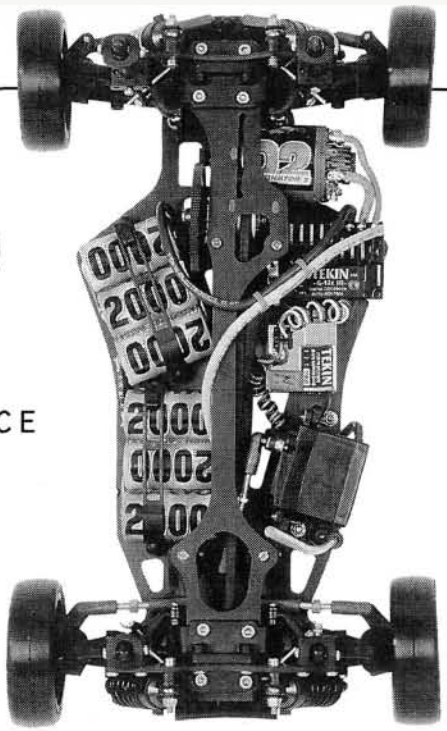
The wing itself is not included, but Kimbrough's body to wing mount will accommodate almost any 1/10-scale wing. Be sure to install the wing mount before you drill holes in the wing. I used Kimbrough's no. 327 clear plastic wing. Its side dams are molded into the main part of the wing, and that strengthens the structure and ensures stability on long straightaways. The wing to body mount is very durable and is a definite timesaver. I got excellent traction and handling with this setup on my speedway cars. Also, this mount can be used with touring cars and NASCAR bodies. If you plan to do any outdoor or superspeedway racing, this product is a must-have!

—Kevin Meyer

PHOTOS BY KEVIN MEYER



Kimbrough's body to wing mount is easy to set up on your car. Follow the kit instructions and you'll have a cool-looking finished product—no more removing the wing before taking off the body! The .078-inch piano wire makes this a very burly assembly and is mounted securely to the body with the included mounting brackets. Adjust the clear plastic wing—also available in black, white and hot pink—by moving it forward or backward on the mount.



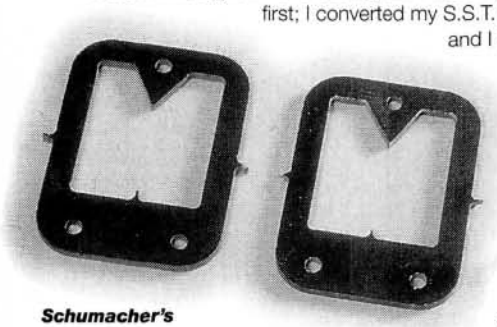
SCHUMACHER S.S.T. 2000 Side Saddle Chassis

Better Performance, Better Steering and Easier Maintenance

Here's something new from Schumacher*—a chassis set for their S.S.T 2000 tourer. The dual-deck, fiberglass, Side Saddle chassis' layout resembles the Yokomo YR-4 II's: all six battery cells are mounted on the right side of the chassis, while the electronics (receiver and speed control) are mounted on the left side. This provides the main drive belt with a "straight run" for more efficiently driving the front wheels. The Side Saddle chassis also places more of the car's weight toward the front to improve high-speed steering.

Racers will find the setup user-friendly. With the Ni-Cds on one side and the electronics on the other, everything is readily accessible; it's even easier to remove and install the batteries.

Because all the electronics are on the side of the chassis, the motor will be given more cooling air. I was skeptical about this at first; I converted my S.S.T. to this chassis, and I saw that the cells, which can get very warm while racing, are now away from the motor. Though I'm not certain a greater airflow reaches the motor with this new layout, it certainly doesn't hurt to have your hot batteries away from your motor .



Schumacher's chassis-balancing plates.

Schumacher says that two of the chassis' greatest advantages are that it's lighter and it flexes a little. Why would you want your chassis to flex? It makes the car easier to drive by making it less sensitive to incorrect suspension settings; if you run the wrong springs or the wrong shock oil, a chassis that flexes will cope better than one that's completely rigid. This flexing is mostly the result of the top plate's being very narrow (this plate can also be used on all other S.S.T. chassis).

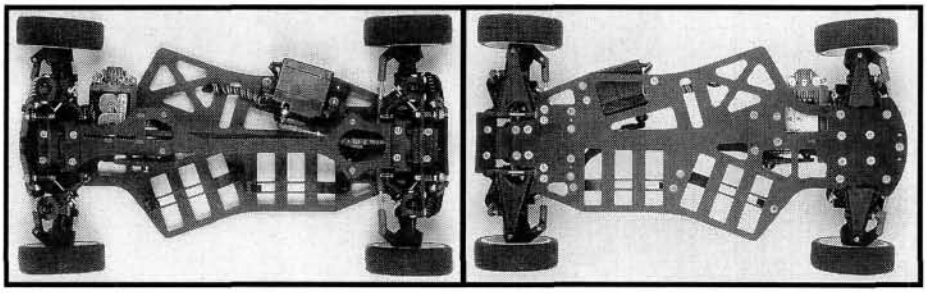
To be honest, I didn't think that the chassis flexed very much, so I contacted Schumacher for information. Apparently, they tested plates ranging from tight to loose in terms of flexibility, and they settled on a plate that flexes very little—just enough to benefit the car's handling the most. Some touring-car designs have a ton of flex (much more than the S.S.T); some work well; others are questionable. Only more track time with the S.S.T. will tell me whether Schumacher has really found the "sweet spot."

Included with the chassis kit is an excellent tuning tool that allows you to check the car's overall balance. To check the balance, remove the front and rear shock towers and the shocks, and replace the shock towers with two fiberglass plates that have holes from which the chassis can be suspended. By hanging the car from these plates, you can configure your electronic gear to provide perfect left/right balance; the result is neutral and consistent handling. Kudos to Schumacher for including this invaluable tuning aid. There's also a setup sheet that gives instructions for tuning and recommendations for radio-gear placement.

If you run an S.S.T. and are looking for a little more steering from your car, or you want a car that is less sensitive to tuning subtleties, you might want to check out this chassis. If you don't own any saddle packs and don't want to use them, hang tight: I heard a rumor that Schumacher is working on a similar chassis design for stick packs.

Ask for part no. U2027 (Side Saddle chassis kit), U2028 (Graphite Side Saddle chassis), or U2029 (Fiberglass Slim Top chassis)

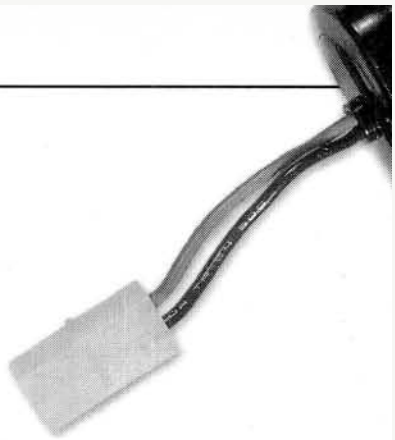
—John Howell



PHOTOS BY WALTER SIDAS

TRINITY AMP MAX 1400 Plus

MORE BANG FOR THE BUCK



ALTHOUGH THE NEW 2000mAh super batteries have become the norm for racers, "the rest of us" still need rugged, reliable, economical packs for the rigors of fun-running and backyard bashing. Enter Trinity's* newest AMP MAX 1400 Plus packs.

I tried the AMP MAX 1400 Plus in several vehicles—from my off-road truck to my boat—with excellent results in all situations. Not only did I get lots of run time (make that fun time), but the packs had loads of punch for tire-turning, water-churning torque, charge after charge.

The construction of the packs is of very high quality. Protective plastic end caps and heavy heat-shrink wrap make this a very sturdy pack. The wire leads could be thicker, however. A 13- or 14-gauge silicone-coated wire would be a nice upgrade. With the environment in mind, Trinity's packs carry the RBRC label, which means that they are in compliance with the USA's recycling program.

The power produced by the AMP MAX is more than sufficient for sport and spec use. The 6-cell, stick-pack configuration covers many vehicle applications and is a great choice for spec racing, or for just spinning your wheels on the street corner with your R/C buddies. ***—Kevin Meyer***

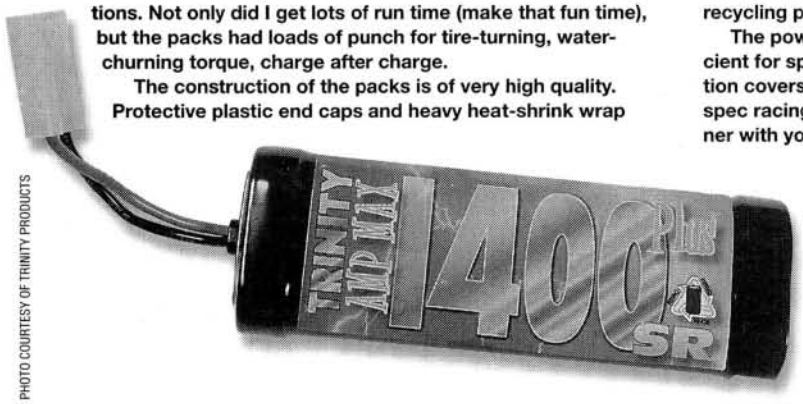


PHOTO COURTESY OF TRINITY PRODUCTS

Trinity's Amp Max 1400 Plus has plenty of punch and run time for backyard fun or spec racing. The stick pack meets almost all vehicle applications. The packaged cells have protective end caps and sturdy heat-shrink wrap.

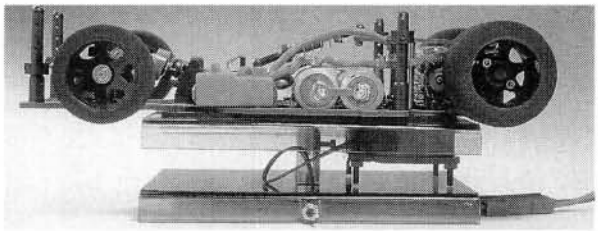
KAWADA Motor Cooling Car Stand

MOTOR COOLIN' MACHINES

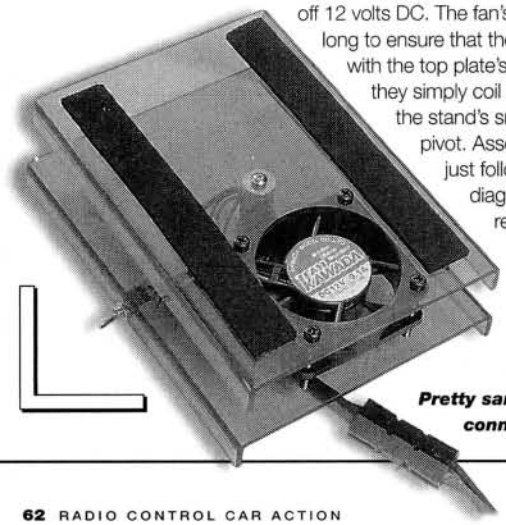
TWO MUST-HAVES for a day of racing are a cooling fan and a car stand. Ironically, these are also the items that I most often forget when I hit the track! I'm the guy you see balancing his car on a rock while he blows on the motor to cool it. Needless to say, I was very pleased to see Kawada's* new fan-equipped car stand on the "Product Watch" roster.

The stand is a two-tiered affair constructed of transparent blue acrylic. The top portion rotates to allow easy wrenching, and it features a small DC fan positioned to cool the car's motor. The fan is wired into a switch in the unit's base; it draws just 1/10 amp and runs off 12 volts DC. The fan's leads are extra long to ensure that they don't interfere with the top plate's pivoting action; they simply coil and uncoil around the stand's smoothly turning pivot. Assembly is simple: just follow the exploded diagram (if you can read the Japanese text, more power to you). The only thing I found remotely difficult was wiring the switch for the fan; although Kawada's schematic is clear, the switch's tiny contacts made soldering a little tricky. The car stand is ideal for my 1/12-scale car; 1/10-scale pan cars also work well on the Kawada stand, but sedans and off-road vehicles aren't a good match. When used with the appropriate 1/10- and 1/12-scale cars, the motor sits directly over the fan, and the chassis is well supported. The car's wheels remain free to spin, so it's easy to apply tire compound. Although the tiny fan doesn't quite produce a tornado-like blast, its steady stream is well concentrated. The only improvement I intend to make is to shorten the screws used to mount the fan; they're longer than necessary and almost contact the lower plate. I don't want to scratch that snazzy blue acrylic!

—Peter Vieira



The Kawada stand is ideal for 1/12 cars; the fan is in the perfect spot to cool the motor, or you can scoot the car back and get the batteries into the breeze.

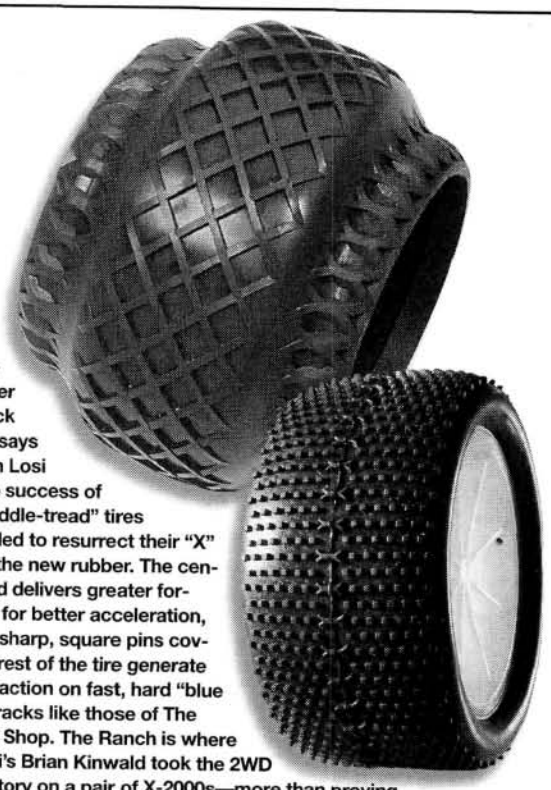


Pretty sano, isn't it? The only item not supplied is the connector; everything else is ready to assemble.

PHOTOS BY WALTER SIDAS

TEAM LOSI X-2000 Tires

WORLDS WINNING TREADS



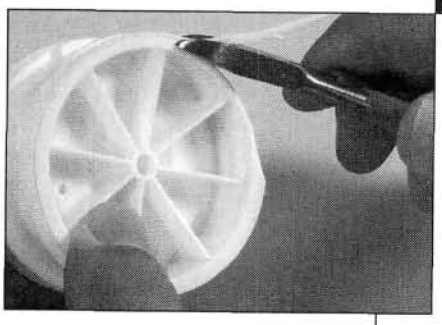
CARPET RACERS AND the 1/8-scale on-road guys probably eat up the most tires, but it's the off-roaders who pack the greatest variety of treads when they hit the track. From spikes to pins to lugs, there's a tire to suit virtually any condition. If your track conditions are, say, like the IFMAR World Championship's, then Losi* has just the tire for you: meet the X-2000 buggy rear tire.

While Losi have more than a few capable tread designs in their tire arsenal, they wanted something special to run at the Worlds. According to Team Losi's Jack Johnson, the new X-2000 was designed to combine the best traits of their Sprint and IFMAR pin tires. Developed by Jack, Gil Losi Jr. and Vance Strader, the tire was designed to resist lateral forces (as encountered under cornering) yet to remain vertically compliant (squashy) to absorb bump forces. To achieve this, thick X ribs strengthen the sidewalls to offer support in the turns. Under compression, the ribs "give" easily to soften the blows of a bumpy track. The central tread area also sports X ribbing, but the ribs feather into a smooth, unsupported area before meeting the sidewall. This creates a "softer" tread area that can conform better to the track surface. As a result, the X design supports the tire evenly so that it responds to bumps consistently, regardless of the direction the force comes from.

As for the tread itself, the X-2000 is aptly named not only for all those internal Xs, but also for its X-pattern center tread. Jack Johnson says that Team Losi noted the success of other "middle-tread" tires and decided to resurrect their "X" motif for the new rubber. The center X tread delivers greater forward bite for better acceleration, while the sharp, square pins covering the rest of the tire generate gobs of traction on fast, hard "blue groove" tracks like those of The Ranch Pit Shop. The Ranch is where Team Losi's Brian Kinwald took the 2WD buggy victory on a pair of X-2000s—more than proving the capabilities of the new design. If you race on similar tracks, the X-2000 just might be the tire for you! —*Peter Vieira*

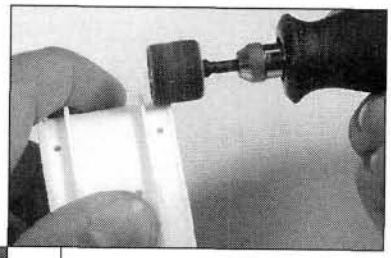
TUNING TRICK

Here's a little trick that Team Losi used at the IFMAR World Champs (as spied by John Howell). To gain additional sidewall flexibility and greater sidebite, Losi drivers trimmed the outside bead off the rims and glued the tires flush with the outer edge of the rims. Here's how to do it:



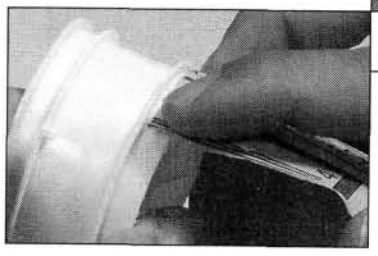
1

Nip off the outer lip of the rim with sidecutters.



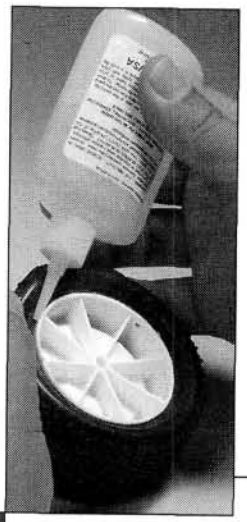
2

Use a Dremel tool with a sanding drum to deburr the rim.



3

Finish smoothing the rim with 100-grit sandpaper. A smooth rim means a better glue joint.

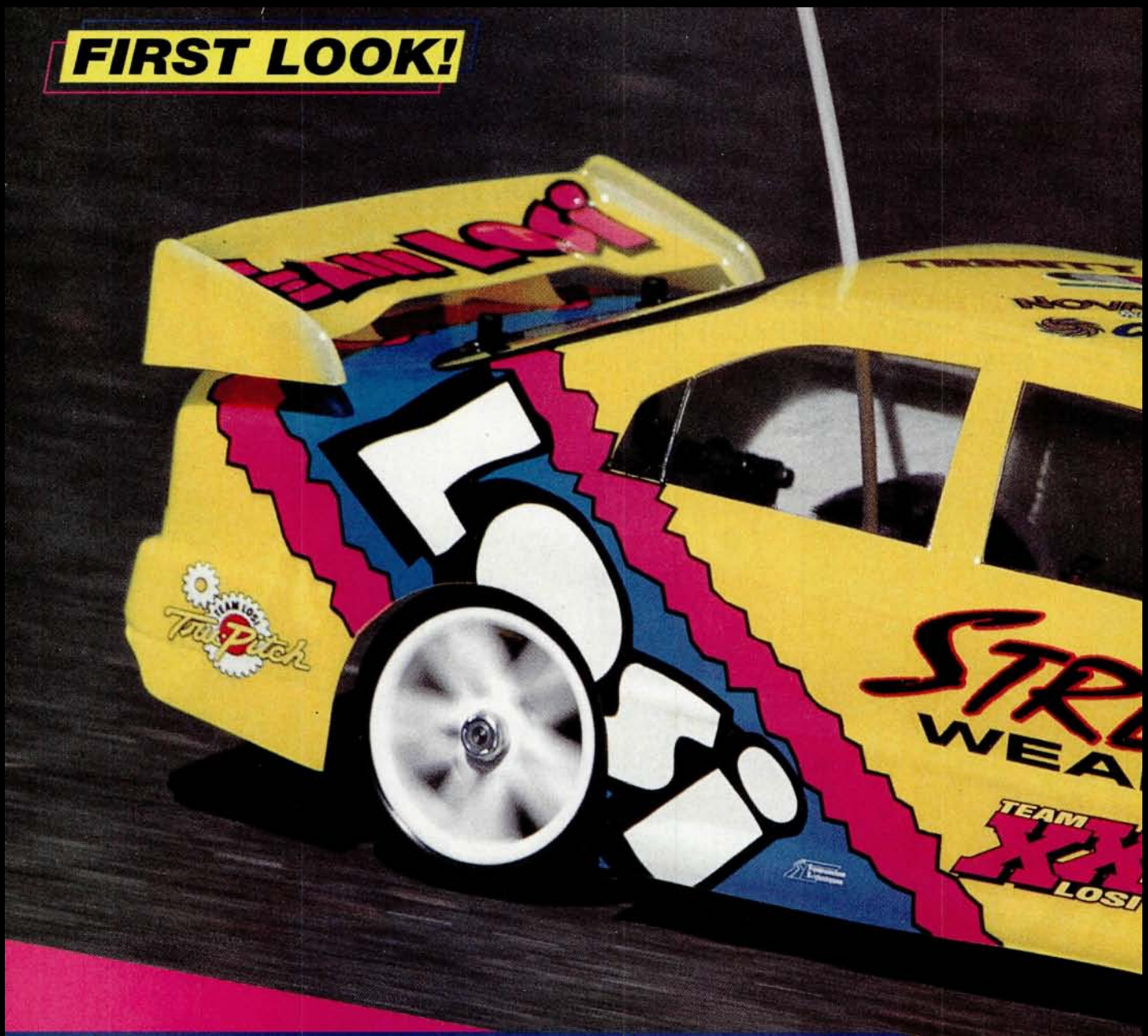


4

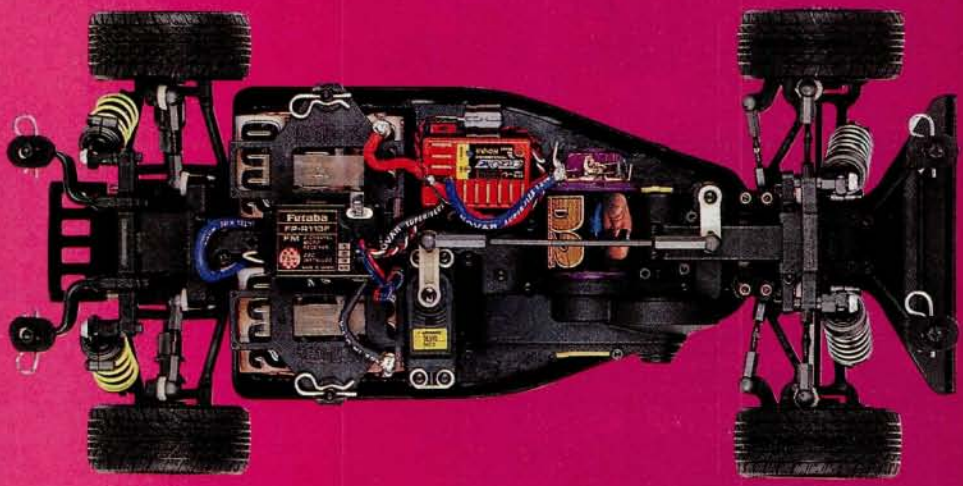
Glue the tires so that the bead is flush with the rim. Glue carefully and fill any gaps after the glue has dried. A good bond is a must.

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

FIRST LOOK!



Taking aim at the sedan market



KIT FEATURES

In Street Weapon form, the XX-4 enjoys certain durability advantages over its open-belt competitors because of its fully sealed drive train; dirt can't get in and mess up the belts and pulleys, and the diffs' action remains smoother for longer. Although identical to that of the XX-4 buggy, the Street Weapon's belt-drive system doesn't use the small rollers that help prevent belt skipping. Obviously, this will free up the belts somewhat so they operate with less friction, and Losi claims that because the Street Weapon is intended for paved surfaces, the belts won't be subjected to

PHOTOS BY JOHN HOWELL AND WALTER SIDAS

TEAM LOSI Street Weapon

by Frank Masi

HAVING PERFORMED the "Thrash Test" on the XX-4 off-road buggy and then, shortly thereafter, having built and driven the new Street Weapon, I'm a little confused. I know that Losi designed the XX-4 as an off-roader first and foremost, but the Street Weapon looks and drives as if it were born to be a touring car! Although it's quite easy to forget, the modern touring car owes its very existence to the off-road buggy; remember that the first Tamiya tourer was based on the Tamiya Manta Ray 4WD buggy, and Yokomo's YR-4 was a variant of the YZ-10 buggy!

the severe loads that come from jumps and ruts; therefore, they should not skip.

Included with the Street Weapon is the XX-4 "clicker" assembly, which operates similarly to a one-way bearing to allow the front wheels to freewheel. Also included is a small, aluminum spacer that allows you to lock the clicker to provide full-time 4WD and 4W braking. Losi recommends that you initially build the car with the clicker locked out—and I agree, as this makes the car much easier to drive. For tight tracks with sharp turns, the clicker's one-way action will provide improved steering both on- and off-power, but you'll lose that surefooted feeling under acceleration and braking.

You won't find the XX-4's trick, dual-pad slipper under the Street Weapon's molded belt cover; instead, Losi includes a molded, 78-tooth spur gear that is keyed directly to the front layshaft. There are two reasons for this change: first, most race rules don't allow the use of a slipper clutch for the touring-car class; second, unless you're running on a gymnasium floor, you don't need one with a 4WD car. If, however, you feel you must have one, the XX-4's slipper will fit the Street Weapon.

TEAM LOSI STREET WEAPON

To provide the proper wheelbase that will allow the Street Weapon to use most of the touring-car bodies that are available, the main chassis (made of Losi's Stiffezell, rather than the XX-4's graphite) has been carefully shortened. Losi chose to alter the chassis length instead of merely sweeping the suspension arms forward or backward in an effort to obtain the right wheelbase. By doing this, they have ensured that the drive shafts exit the diff outdrives as straight as possible. From experience, Losi has found that forward-swept drive shafts can cause the chassis to squat during acceleration, and rearward-swept shafts will actually cause the chassis to lift during acceleration. Both conditions will mess up handling!

Installing an aluminum spacer in place of the spring locks up the Street Weapon's "clicker" and eliminates front one-way action. This makes the car easier to drive.

Because the chassis is shorter, you no longer have the ability to change the location of the batteries to alter handling (as you do with the buggy); there's simply no room between the right-side saddle cells and the steering servo. If you must have a bit more weight over the front wheels, you *can* move the left-side cells forward (as long as your ESC's size permits this); however, to do this, you'll have to buy an additional set of battery holders.

The Street Weapon's rear tires obediently follow the fronts, yet will gladly step out should you desire a controllable drift through the turns.

The Street Weapon's front and rear hubs and arm mounts are identical to those of the XX-4 buggy (except that the Street Weapon has no rear toe-in), but between them are much shorter suspension arms that narrow the car's overall width to within the universally accepted 190mm (7.4 inches). On our tester, the inner camber-rod positions were the same as those of the buggy; however, Losi informs us that they will soon have a revised rear bulkhead/shock tower with a new camber-rod position (one that's lower and farther out). Losi test drivers have found that this new position works a bit better under most circumstances. As soon as it becomes available, the new part will automatically be included with newer Street Weapon kits.

For damping, the Street Weapon uses shortened versions of Losi's proven, hard-anodized, Hard Body shocks. These .36-inch-stroke shocks are the same diameter as those used for Losi's off-road buggies and trucks, so you'll be able to use any of Losi's available pistons to further tune your Street Weapon (the kit comes with red, no. 56 pistons and 80WT silicone oil).

When Losi design a new kit, they are thorough, to say the least; an assortment of 1.15-inch-long springs—specifically made for the Street Weapon—are available to fine tune the shocks. They are color-coded to indicate rate (firmness), and the coding follows the pattern Losi use for their off-road springs: yellows are soft, silvers are a little stiffer, etc.

The kit also includes a very nicely molded body that has similar lines to a Honda Accord Super Touring Car. This "Tolanda" body comes with all the necessary detail stickers, e.g., grill and headlights, plus a very large—and *bright*—blue-and-pink "Team Losi" graphic that covers the rear quarter of the body. All you have to do to finish the body is mask the windows using the included, pre-cut masking, shoot the body in the color of your choice and add the decals—very simple and easy! Molded body-mount posts, which are attached to the Street Weapon's large front bumper and rear shock tower, hold the body securely. They feature really cool little pivoting, padded rests that protect the body's finish and prevent it from cracking.

SPECIFICATIONS

DIMENSIONS

Length overall	17.75 in.
Wheelbase	10.19 in.
Width (F/R)	7.25 in.

CHASSIS

Type	Molded tub
Material	Stiffezell composite

DRIVE TRAIN

Type	Sealed, triple-belt drive
Transmission	Universal swing shafts
Differential(s)	Adjustable ball diffs
Slipper clutch	Optional*
Bearings/bushings	Sealed ball bearings

SUSPENSION (F/R)

Type	Lower wishbone/adjustable upper link
Damping	Oil-filled, coil-over shocks

WHEELS (F/R)

Type	5-spoke touring car

TIRES (F/R) Losi LST S-10 treaded

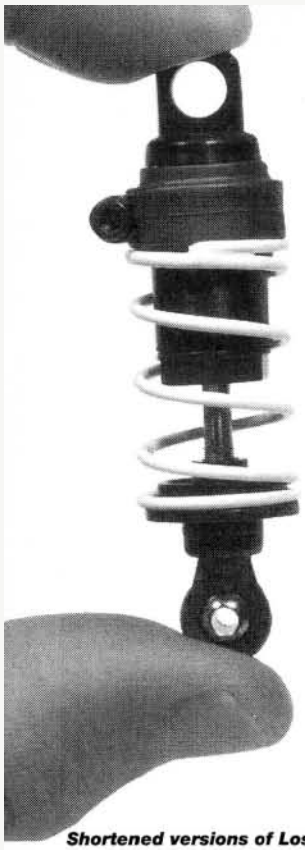
ELECTRICS

Motor, battery, ESC	Not included

LIST PRICE $399.95

* Slipper clutch not legal for most sanctioned competition

Losi's sharp, 5-spoke wheels with new LST S-10 tires and contoured inserts. These super-low-profile tires work awesome on asphalt surfaces.



Shortened versions of Losi's Hard Body shocks damp the Street Weapon at all four corners. Losi has also developed a new range of color-coded springs to complement the new shocks.

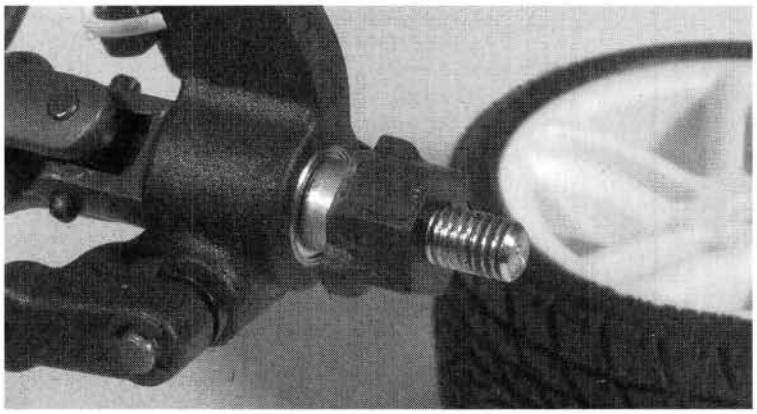
TEAM LOSI STREET WEAPON

FIRST DRIVE!

Our Street Weapon was built using the recommended setup from the instruction manual, which should be a good starting point regardless of the type of surface on which you plan to run. Because their chassis are practically identical, I was able to swap all the running gear (Futaba* 3PJ FM transmitter with FP-R113F receiver, Airtronics* 94158 servo and Novak* Cyclone ESC) from my XX-4 buggy right to the Street Weapon—a task made much easier now that I've begun to mount all of my ESCs and receivers using Velcro®-brand tape instead of servo tape.

Losi could have taken the easy route and designed the Street Weapon so it used the many types of sedan wheels and tires currently available; instead, they chose to design not only their own sharp-looking, five-spoke wheels, but also super-low-profile treaded tires. The LST S-10 tires come with a special, profiled foam insert that fits the contour of the tire much better than a traditional foam insert. Before gluing the tire, you must first glue the ends of the insert together using contact cement. I went one step further and glued the inserts to the inside of the tires, too; during acceleration, this prevents the insert from shifting and the tire from expanding.

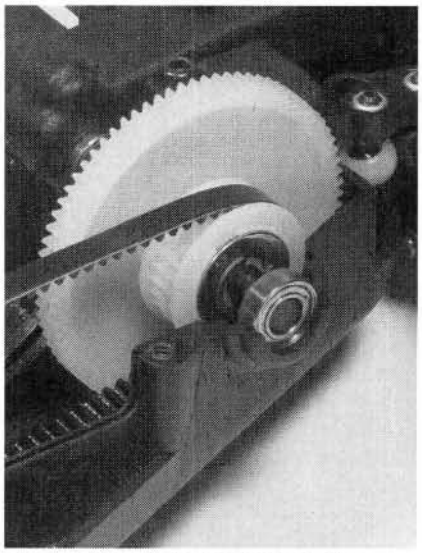
Our parking lot is fairly smooth, with a slight dusting here and there of leftover sand (we East Coasters can never truly escape winter). On this surface, the Losi tires endowed the Street Weapon with very neutral handling, perhaps the best I've driven. Some cars tend to have front and rear ends that fight each other for grip, each vying for supremacy. This is usually because the suspension geometry isn't quite right, and as a result, you're saddled with an unruly beast.



Power to all four wheels comes via shortened versions of the XX-4's dog-bone/universal shafts.

The Street Weapon's rear tires obediently follow the fronts, yet will gladly step out should you desire a controllable drift through the turns.

As I wrote earlier, I like the way the car feels with the clicker device locked. During full-throttle takeoffs, the Street Weapon tracks arrow-straight, and the braking is precise and controllable. The car has just a hint of understeer during high-speed turn-in, but if slowed a bit, it will go right where you want it to without needing to brake. Coming out of turns, the Street Weapon obeys your commands quite willingly—even at full throttle. Honestly, I can't imagine that I'd ever want to enable the clicker; it would have to be one tight track. Despite using some rather serious horsepower (a Trinity* D2 11-turn motor with a VIS-EXTRA, Sanyo RC2000 battery pack yanked straight from my too-fast XX-4 buggy), the Street Weapon instilled me with a sense of confidence and control. I'm gonna do well with this car!



Gone is the XX-4's slipper clutch. The Street Weapon uses a new, molded, 78-tooth spur gear to directly drive the front and rear ball diffs.

FINAL THOUGHTS

Forget any notion that the Street Weapon is merely the XX-4 with slapped-on sedan suspension pieces. Losi obviously spent a lot of track time perfecting the car's suspension and chassis; you don't just slap together a car that handles this consistently. Priced about the same as its competitors, the Street Weapon adds the "Made in America" label to its already impressive curb appeal. This means that spare parts are as close as your local hobby shop, and you know they already stock a healthy supply of Losi. We plan to spend more time with the Street Weapon (look for updates in future issues), but if our first impressions are accurate, the first American-made 4WD touring car has been built right!

**Addresses are listed alphabetically in the Index of manufacturers on page 224.* ■

thrash TEST

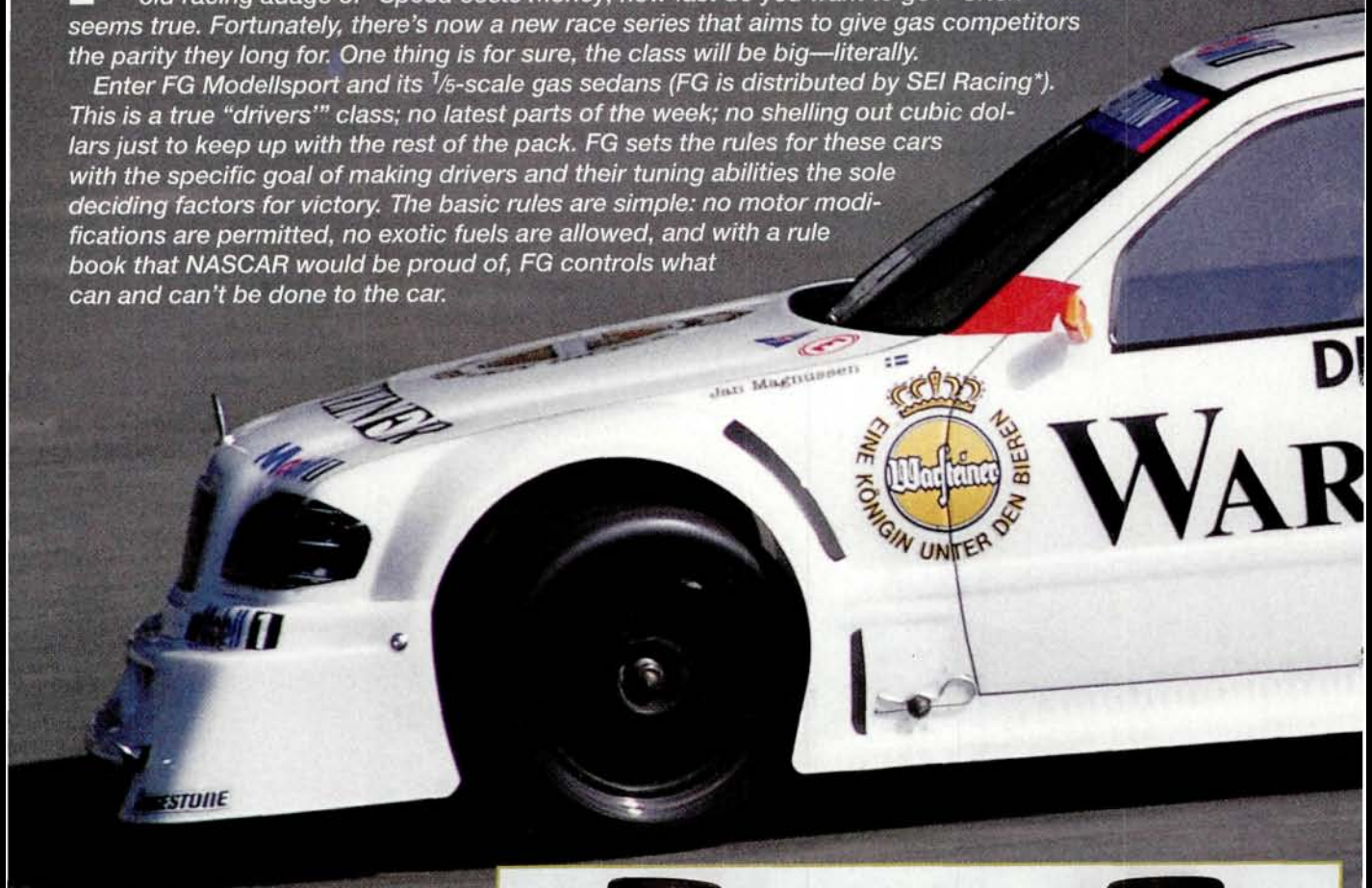
1/5 scale gas

FG MODELLSPORT AMG Mercedes C-Klasse

by Frank Killam

FOR MANY R/C racers, the dream of a "level playing field" remains as elusive as an E-clip dropped into a shag rug. This is especially true of gas racers, for whom the old racing adage of "Speed costs money; how fast do you want to go?" often seems true. Fortunately, there's now a new race series that aims to give gas competitors the parity they long for. One thing is for sure, the class will be big—literally.

Enter FG Modellsport and its 1/5-scale gas sedans (FG is distributed by SEI Racing). This is a true "drivers'" class; no latest parts of the week; no shelling out cubic dollars just to keep up with the rest of the pack. FG sets the rules for these cars with the specific goal of making drivers and their tuning abilities the sole deciding factors for victory. The basic rules are simple: no motor modifications are permitted, no exotic fuels are allowed, and with a rule book that NASCAR would be proud of, FG controls what can and can't be done to the car.*



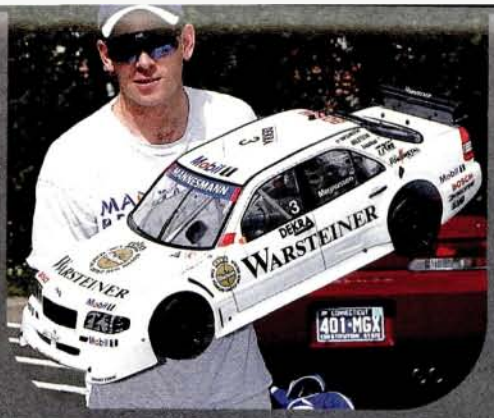
Specifications

- Length—31 to 36 in.
- Width—14.75 to 15.5 in.
- Height—7-9.5 in.
- Weight—21 to 23 lb.
- Wheelbase—18.21 in.
- Run time on a full tank—45 min.
- Top speed—55mph (with standard gearing).

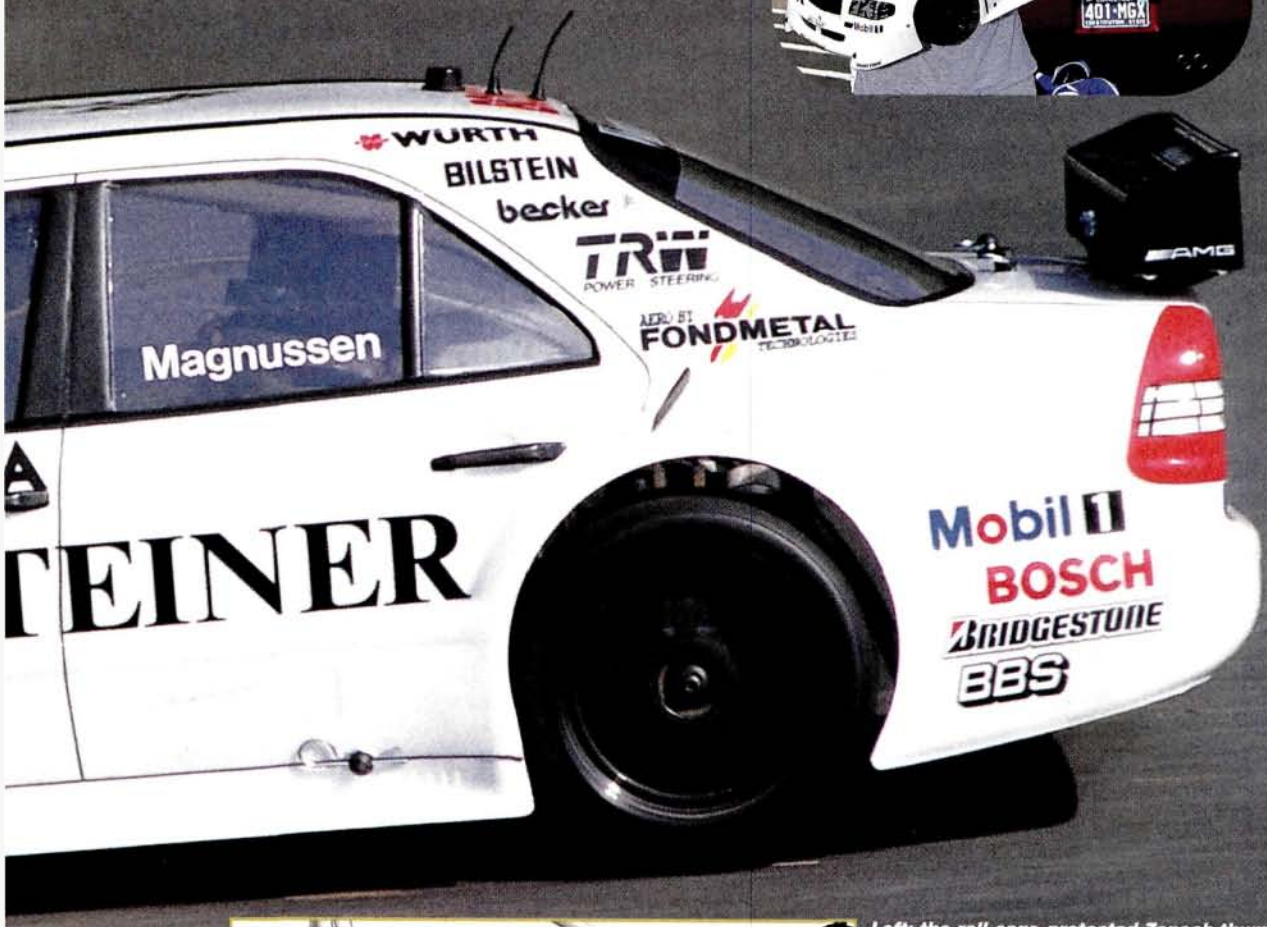
Although everything is substantially more beefy, the 1/5-scale chassis is no more complex than a typical 1/10-scale sedan.

PHOTOS BY JOHN HOWELL AND WALTER SIOAS

BAVARIAN BE

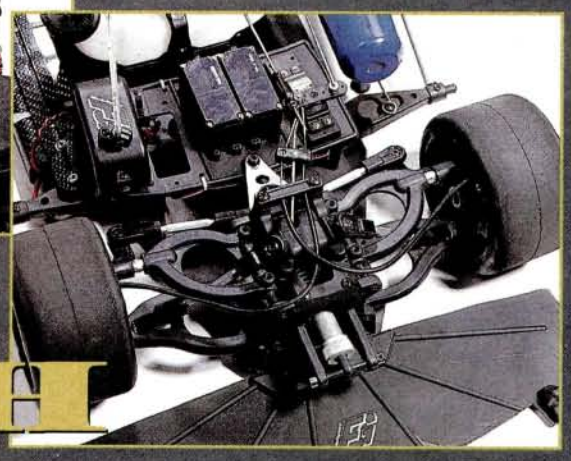


It's big, but it's friendly; we had a blast running the FG Mercedes for these photos.



Left: the roll-cage-protected Zenoah thumper displaces 22.5cc and delivers plenty of muscle for intense, high-speed action.

Below: check out the curvaceous upper and lower A-arms and the disk-brake cable actuation system. It's a lot simpler than it looks.



HEMOTH

AMG MERCEDES C-KLASSE

FEATURES

Leave it to the Germans to over-engineer a model as if it were a Formula 1 car. The chassis is made of aircraft-quality aluminum to which all the components are bolted to make a monocoque-like structure. Front and rear suspension systems feature full ball bearings, and all suspension parts pivot on oversize ball ends. The radio gear is mounted on a rigid center tray and can be sealed for driving in the wet (in Europe they drive these cars in the rain!).

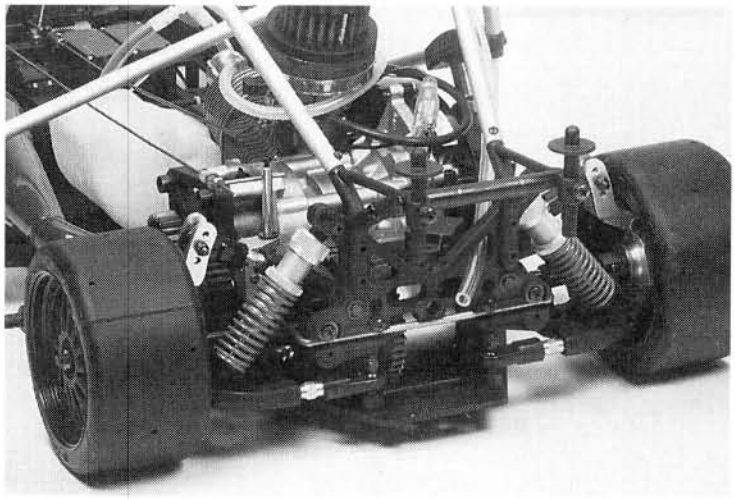
The power train consists of a 22.5cc gasoline-burning 2-stroke engine making about 2.6hp at 18,000rpm. This engine drives a centrifugal clutch through a quick-change external gear set. A second gear set drives the center-mounted gear diff.

The rear suspension consists of upper and lower A-arms, oil-damped coil-over shocks and an anti-roll bar. The rear is adjustable for ride height, shock angle, toe and camber. To aid tuning, FG and Eibach* offer after-market spring sets for this car.

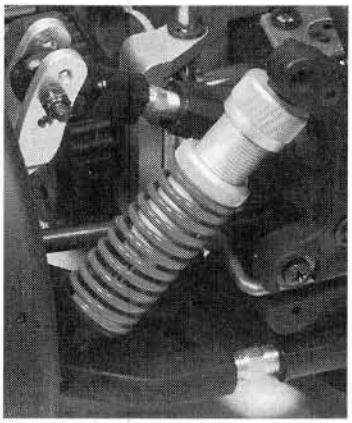
The front suspension could have been lifted right out of a Formula 1 car: upper and lower A-arms equipped with pushrods articulate a single shock absorber. This design allows easier adjustability because it eliminates the need for swaybars, and tweak is never an issue. Up front, camber, toe, caster, spring rates, shock oil, shock damping, tweak spring preload and ride height are all adjustable.

On the FG cars, the radio system is one thing that should not be compromised. A PCM system is a must for its fail-safe capability: a runaway 22- to 23-pound car can do some serious damage! Two ¼-scale "stump puller" servos are used for steering and, depending on your brake option, one or two heavy-duty servos are used to operate the throttle and the brakes.

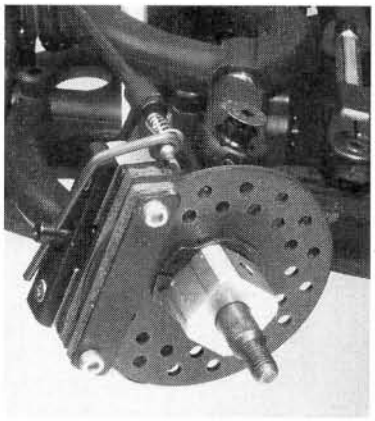
The tires in the kit are very much like standard ⅒-scale rubber—only bigger. They're belted and made of a very sticky go-kart compound that surrounds a foam liner mounted on a one-piece molded wheel of composite construction.



Heavy-duty shocks and chunky aluminum hubs lend strength to the rear of the car. The differential is visible between the bulkhead uprights, as is the rear swaybar. The small hose is the fuel-tank vent.



The FG shocks feature threaded bodies for precise pre-load adjustment. Note the turnbuckle in the suspension arm; it facilitates toe-in adjustments.



Hey, how'd this shot of a full-scale disk brake get in here? Each of the Mercedes' front wheels has its own ventilated disk brake and caliper.

Building & Setup Tips

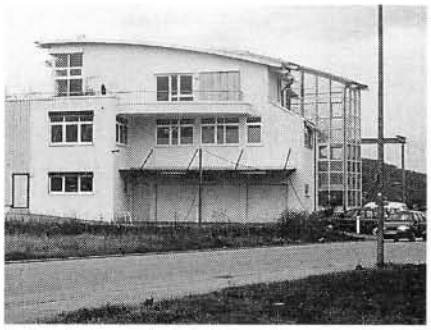
- **Loctite is essential. Any screw or bolt that is threaded into a metal part should get a dab!**
- **Get a good shock oil and spring selection. The key to winning is chassis setup, not dollars!**
- **Pay close attention to camber and caster settings.**
- **Use a good 2-stroke oil formulated for air-cooled engines.**

THINGS YOU'LL NEED

- High-end 2- or 3-channel radio with three or four servos.
- 5- or 6-cell battery pack.
- Metric tools.

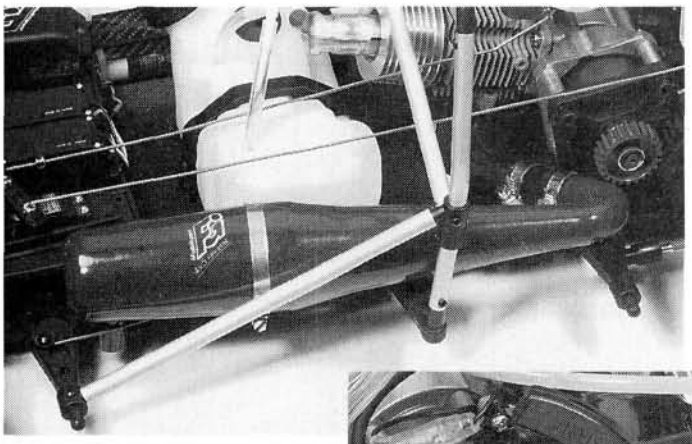
FACTORY OPTIONS

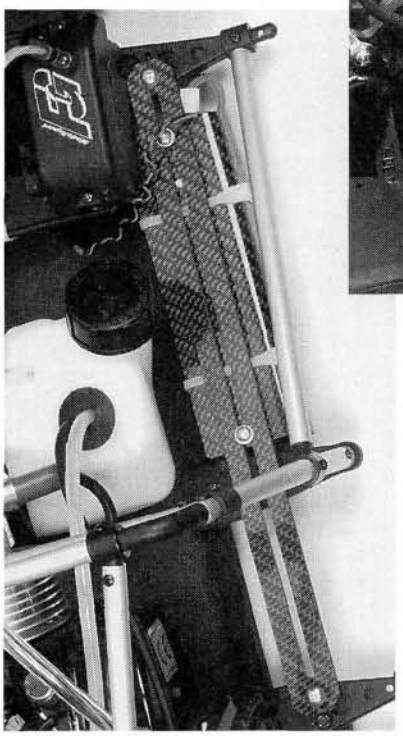
- Rear swaybars—part no. 7071 (4mm); 7071/1 (5mm).
- Rear shock springs—7182 (2.3mm yellow/soft); 7183 (2.4mm red/middle); 7184 (2.5mm blue/hard).
- Front shock springs—7180 (1.8mm pink/soft); 7181 (1.9mm green/middle).
- Graphite chassis—7010/3.
- Graphite radio tray—5414.
- 4-wheel disk brakes—8450/2 (front); 8451/1 (rear).
- Adjustable clutch—8440.
- Adjustable differential—8485/1.
- Tuned pipes—7400/2.
- Alloy front suspension uprights—7103/5.
- Alloy rear suspension uprights—6477.
- Tires available in 7 different compounds.
- Varying gear sets.



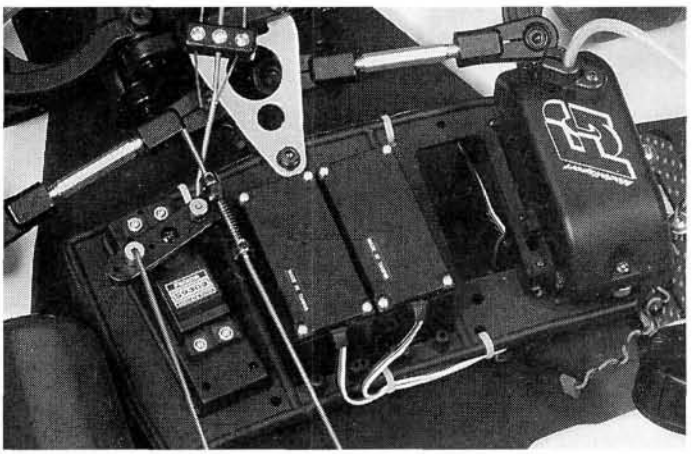
FG Modellsport

Franz Groschl's FG Modellsport GmbH is located 25 miles east of Stuttgart, Germany, and for the last eight years has provided the R/C enthusiasts with a truly top-quality product. From a large 40,000-square-foot factory, 25 employees turn out over 6,000 models per year, and with annual sales in the millions, this company is here to stay.





■ *Top: a tuned pipe maximizes the horsepower of the Zenoah engine. The pipe is about the size of a bowling pin!* ■ *Above: a burly pull-start mechanism makes the FG Mercedes as easy to start as a weed-whacker.* ■ *Left: hey, it just isn't trick if it doesn't have carbon fiber. This is actually the battery holder; a 7.2V pack powers the required he-man servos.*



The box with the FG logo houses the receiver. The two inverted servos handle the steering, and the single upright servo yanks the throttle and brake.

The body shells are amazing. True to scale in appearance and pulled from .080-inch-thick Lexan, they are incredibly strong.

In action, FG's cars are very scale-like—from the body shapes and graphics to their impressive size and the way they handle on the racetrack. Lots of suspension action is visible from the drivers' stand as the cars corner and respond to the track. When braking, the car's nose dives; when accelerating, the rear droops. When cornering, there is some body roll, but it is very well controlled. The brakes are pretty good, especially when you consider that they stop a 22- to 23-pound car. Power delivery is impressive; during races, the car has no problem spinning the rear tires under acceleration. On a track with long straights, top-end speed is close to 55mph with the kit gearing. On cold tires, the car is a bit tricky to maneuver, but when the tires are up to temp (around 110 degrees), the car comes alive! Granted, all this high-performance promise comes with a rather tall start-up price, but consider the overall cost of running a competitive 1/10-scale modified car for a whole season, and you'll find the costs remarkably similar. The cars are manufactured in Germany and are shipped fully assembled. You only have to install your radio, mount the tires, and paint and decal the body. If you wish, for a few bucks more, SEI Racing, the exclusive U.S. distributor, will set you up with a radio, servos and even a factory-painted body. Then all you need is a can of gas and some 2-stroke oil, and you're racing!

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

Likes

- **Spectacular performance.**
- **Wonderful scale appearance.**
- **First-class quality.**
- **Fun to drive.**
- **Easy starting motor ... and you don't have to be Ron Paris to tune it!**

Dislikes

- **High start-up costs.**
- **Tires are a pain to assemble the first time.**
- **Instructions could be better.**

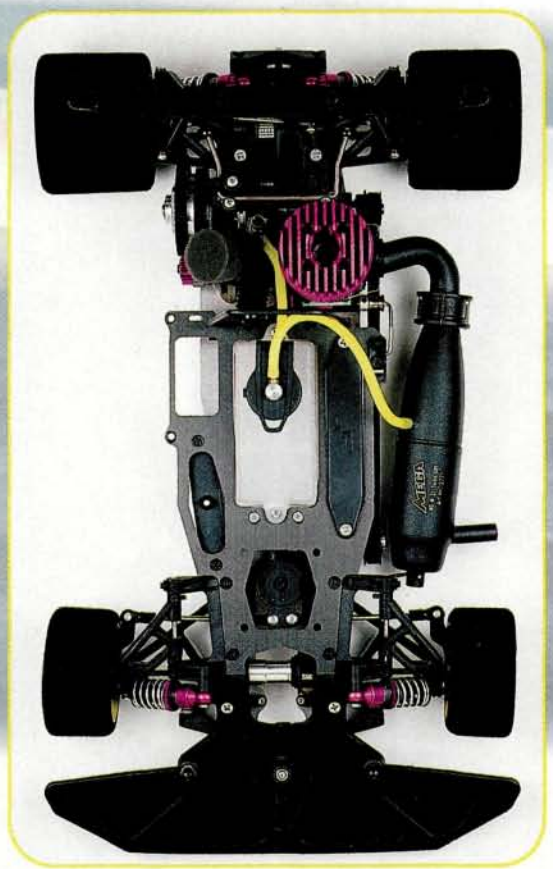
the Competition	Yankee Opel Calibra	FG Modellsport Sedan
Wheelbase	18.5 in.	18.21 in.
Width (F/R)	15 in.	14.75/15.5 in.
Weight	NA	21-23 lb.**
Diff type	Planetary	Planetary
Brakes	Fiberglass disk	Dual disk
Exhaust	Header and pipe	Header and pipe
Price	$1,495	$1,445
Issue reviewed	1/97	11/97

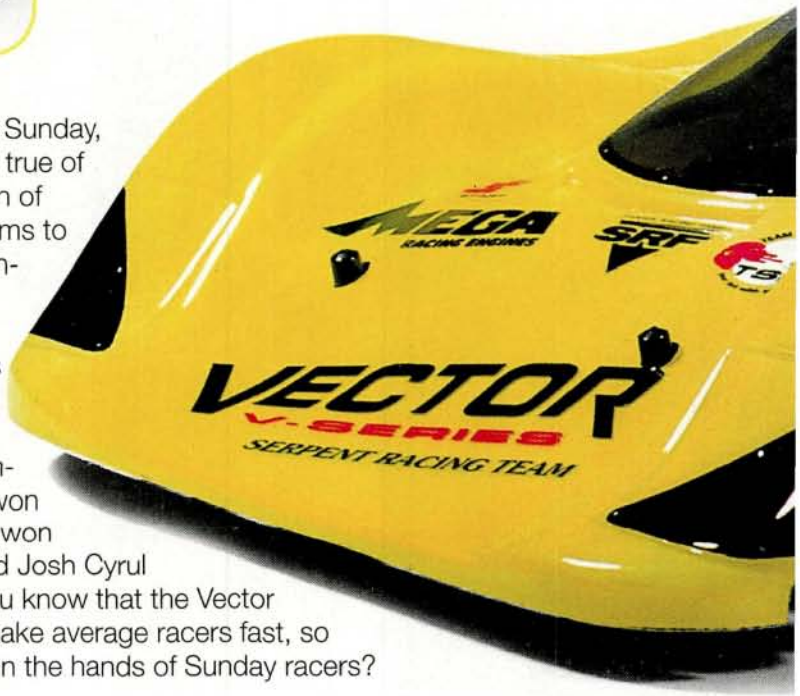
**Prices vary with location.*
***Weight varies with setup.*

thrash TEST
1/8 scale gas

SERPENT **Vector**

by Mike Myers





WE'VE ALL HEARD: "What wins on Sunday, sells on Monday," but this is more true of some forms of R/C car racing than of others. In 1/8-scale gas-car racing, there seems to be a lot more involved than just picking a winning kit off a hobby-shop shelf. It's true that racers want a car that has put a pro in the winners' circle, but they also want one that's forgiving enough to allow average racers to put in a good race at the club.

Serpent's* Vector is already a proven winner in the professional ranks: Art Carbonell won the 1996 US ROAR Nationals with it, Collari won the IFMAR World Championships with it, and Josh Cyrul won the 1997 ROAR Nationals with it, so you know that the Vector has the goods! But Serpent also wants to make average racers fast, so the question is: will the Vector really do well in the hands of Sunday racers?

specifications

SCALE	1/8
LIST PRICES	$1,095 (4WD), $895 (2WD)

DIMENSIONS

Length overall	17.56 in.
Wheelbase	11.811 in.
Width (F/R)	10.43 in.

WEIGHT (gross, RTR)	6 lb., 14 oz.

CHASSIS

Type	Plate
Material	7075-T6 machined-aluminum

DRIVE TRAIN

Type	Belt drive
Primary	Pinion/spur
Transmission	Centrifugal activation, 2-speed
Differential(s)	Independent one-way bearings (front only)
Bearings/bushings	Bearings
Clutch	Serpent Centax adjustable

SUSPENSION (F/R)

Type	4W independent double A-arm
Damping	Large-volume, oil-filled, coil-over shocks

WHEELS (F/R)	One-piece, molded, BBS-style
TIRES (F/R)	Foam

POWERPLANT

Engine	Serpent Mega SX-21*
Pipe	No. 2783*
Carb	9mm slide*

*optional

PHOTOS BY GEORGE GONZALES AND WALTER SIDAS

O.S.® .21 RZ and .21 RG engines — advanced engineering that's way ahead of the game

Whether you're racing just for fun or for all the marbles, nothing beats that winning feeling. And for getting that feeling, nothing beats the new .21 RG and .21 RZ engines from O.S.

These hot new power plants are the latest and greatest from the leader in nitro buggy and on-road engine technology, with so many exciting innovations, the competition just can't keep up. The combination of extraordinary features and affordable price makes O.S. .21 RG and RZ engines a super value!

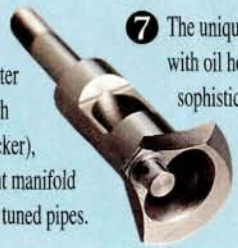
Both sport an impressive list of "standard" features:

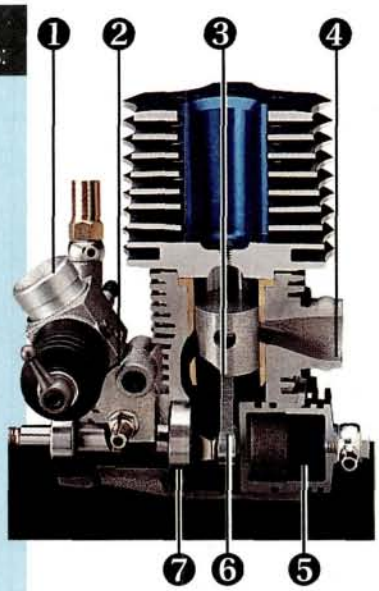
- An engine design that dissipates heat more quickly to prevent distortion.
- A large flow-thru bar stock aluminum cooling head.
- A needle valve that can be easily adjusted with a screwdriver.
- A fuel inlet designed to eliminate needle breakage.
- A slide valve throttle setup with ball link that resists turning, for more precise adjustments.
- An included exhaust adapter and high quality "super" air cleaner.

Complex machining has produced a unique flow-thru cooling head design that boosts performance.

If you're a competition racer seeking that critical edge, check out the advantages of the RZ-B (Buggy) and RZ-R (On-Road) engines:

1. Intake parts have been polished for smoother air flow.
2. An insulating thermal plastic ring on the carb mounting reduces carb overheating (which can affect needle valve settings), and aids in race tuning.
3. A custom-shaped piston reduces weight for quicker acceleration and better cooling.
4. The exhaust port is cast as part of the cylinder for better exhaust flow (which dissipates heat quicker), and matches current manifold sizes to fit existing tuned pipes.
5. A special intake chamber neutralizes pressure pulse differences between high and low throttle settings for more consistent transitional acceleration. The crankshaft backplate features an O-ring for a leak-proof seal.
6. The con rod features improved bushing material that's lighter in weight and more durable.
7. The uniquely shaped crankshaft with oil hole is a highly sophisticated performance feature that delivers incredible power.





O.S. .21 RG and RZ car and buggy engines — technology that's ahead of the game, to put you ahead of the pack. See your O.S. dealer today, and experience the difference that quality engineering makes. For a free brochure and the location of the dealer nearest you, please call 1-800-682-8948 and mention code #087Q.

O.S.® ENGINES

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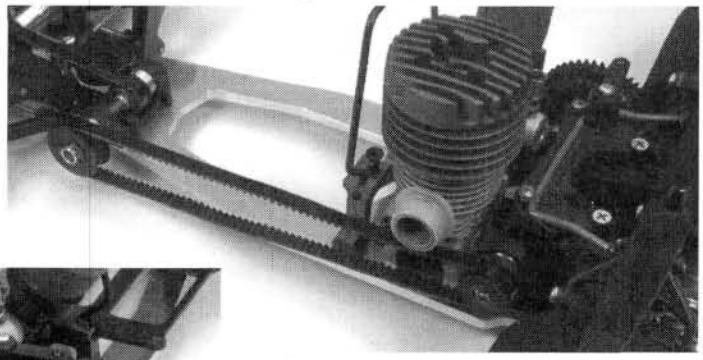
P.O. BOX 9021, CHAMPAIGN, IL 61826-9021

THE KIT

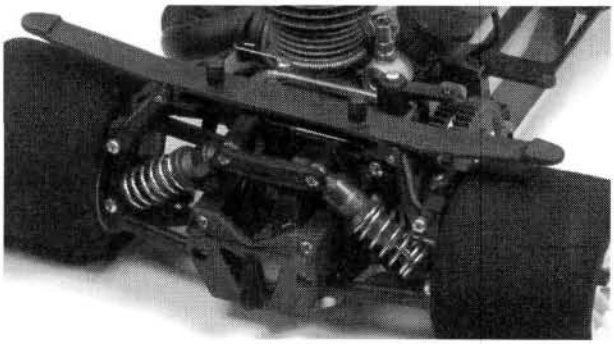
The 1/8-scale nitro-powered Vector was designed for on-road racing. It's available in two versions: a two-wheel-drive (2WD) with a rear differential and a four-wheel-drive (4WD) with solid rear axle. Both versions require a .21-size engine. Serpent sells their own line of "Mega" engines, but engines made by other companies will also work in the Vector. The 4WD drive pulley is available in several sizes, and this, along with the diameter of the foam front and rear tires, determines the car's "overdrive ratio." A typical 4WD R/C vehicle, e.g., a touring car, drives its front and rear wheels at the same speed. The Vector's front and rear wheels can be set to run at different speeds to alter handling; the overdrive ratio determines how great the difference between the front- and rear-wheel speeds will be. Because tire diameter considerably affects the overdrive ratio, tires of the appropriate hardness are essential because uneven wear will alter a car's handling during an event (1/8-scale events can mean an hour of continuous racing). It isn't unusual to see 1/8-scale racers lugging around boxes of tires to ensure they maintain the right setup!

The beautiful Vector chassis is machined out of 5mm-thick 7075-T6 aluminum—precisely cut and brightly finished. It looks like a piece of the Terminator! Several large cutouts reduce weight and allow access to various components. The chassis upper deck is formed by a graphite radio tray; the tray's front is attached to the suspension bulkheads, and the rear is supported by a purple-anodized aluminum truss. This truss also serves as the mount for a hoop/roll-bar that will protect the engine's cooling

Note the absence of a hub carrier; the hub is attached directly to the suspension arms via pivot balls. The upper suspension link is angled to decrease caster as the suspension compresses.



Right: the Vector uses three belts to get the power to the wheels. The center belt tucks behind the tuned pipe for an unimpeded run to the front jackshaft. Below: the Vector's burly rear drive belt sneaks in between the rear shocks. Note the rear body mount, which only contacts the hubs; the body's downforce is channeled into the wheels, not the suspension.



Building & Setup Tips

The parts fit together well—no need for hand-fitting. To get the Vector race-ready, you need only a week's worth of free evenings and an assortment of common tools. It might not be fair to say that building this car is easy because there are a lot of components, and you do need to take your time and make sure you do everything correctly. My most important tip: don't rush!

- **The most critical components are the suspension pieces; they must work smoothly. If something binds, nothing will allow you to tune out the problems it will cause!**
- **Use shrink-wrap to secure the 5-cell battery pack in its holder. Unlike tape, the shrink-wrap won't come undone. If you lose your battery pack in a race, you lose control of your car!**
- **Always use a clean, good-quality air filter. If you use a foam filter, be sure to saturate it with filter oil.**
- **Follow the Serpent "tech" book. It takes you through the car's setup procedure and contains a standard 18-step procedure that gets the car into its standard racing configuration—a good starting point when you're at a new track.**
- **Rubber-mount your servos, so vibration doesn't destroy them.**
- **Use a throttle-return spring, so if your radio does quit, the engine will stop (instead of driving the car at 80mph into a wall!).**
- **The Serpent receiver mount was designed to minimize vibration problems, but it's still a good idea to shrink-wrap the receiver and the mount to keep out dirt and debris.**
- **If you use a receiver "on/off" switch, make sure it's of good quality. Most on-road gas racers don't use a switch; instead, for maximum reliability, they use plug-in connectors.**

THINGS YOU'LL NEED

- High-quality 2-channel radio.
- Two high-torque servos.
- Starter box.
- Glow fuel and glow igniter.
- Fuel bottle for refueling.
- Battery pack to power the radio system.
- Body.
- Lexan-compatible paint.

USEFUL ACCESSORIES

- Temperature probe to measure engine temperature.
- Tire truer.
- Additional sets of tires.

FACTORY OPTIONS

- Adjustable rear anti-roll bar—part no. 909335.
- Spring sets—909415 (white, 1.5mm), 909416 (yellow, 1.6mm), 909417 (red, 1.7mm), 909418 (blue, 1.8mm).
- Differential (comes with 2WD kit)—909375.
- Middle aluminum bearing block—808251.
- Hollow middle shaft—808253.
- Hollow 2-speed shaft—9632.
- Aluminum front quick-change hub levers—9226.
- Aluminum rear quick-change hub levers—909325.
- Michael Salven Lola body—1750.
- Serpent engine-starter box—1400.
- Datalogger—3000.
- Engine—standard 7-port; 2726 (5-port).
- Pipe with spring coupler—2770.

head in a roll-over. The tray is dominated by a large-capacity fuel tank that's directly in front of the engine; the fuel makes a very short trip to the carb.

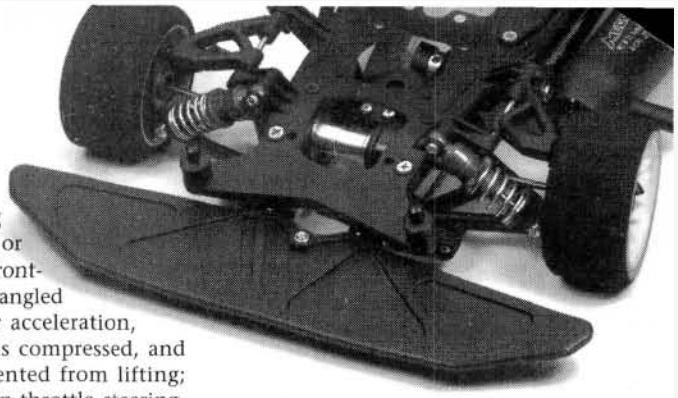
The 4W, fully independent, double A-arm suspension has large-volume, oil-filled adjustable shocks with silver springs. (Serpent also offers color-coded coil springs of several other rates.) To allow ride height to be adjusted precisely, the hard-anodized shock bodies are threaded to accept knurled preload collars.

There's an anti-roll bar at each end of the car. The rear bar resembles those you may have seen on 1/10-scale on- and off-road racers, but the front bar is unique to 1/8 scale. A flat piece of spring steel is attached to each of the front lower A-arms via a small bulkhead. The two spring-steel pieces meet between the lower A-arms' hinge pins and are joined by a ball-and-cup joint. These components act as levers; when one suspension arm moves up, its spring-steel lever pushes down on the other arm's lever. The hinge pin acts as a fulcrum, and the other arm rises. The flexibility of the spring steel absorbs the energy of the roll forces to help keep the Vector level in the turns. Most racers use Serpent's adjustable anti-roll bar, which can be set to provide varying degrees of roll control to suit track conditions. The suspension components are made of a special light, very rugged composite. The suspension is very adjustable, but don't look for turnbuckles; you won't find any.

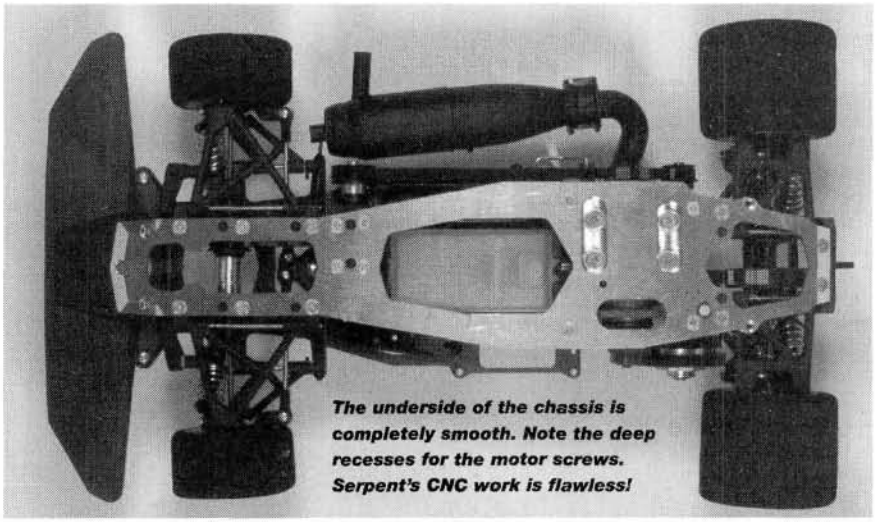
Instead, the Vector hangs all four hubs off pivot balls that are threaded directly into the suspension arms. To alter wheel camber, simply back out or screw in the pivot balls. On the rear suspension, in addition to setting rear-wheel camber, two lower pivot balls allow toe-in to be increased or decreased. The pivot balls allow easy adjustments while producing very little slop or friction.

Snap-in front-suspension spacers position the upper arm on its hinge pin. Set static caster by moving the upper arm forward or backward. The upper front-suspension-arm pin is angled forward so that under acceleration, the front suspension is compressed, and the front end is prevented from lifting; this makes for more on-throttle steering. For faster speeds out of the turns, the angled hinge-pin design also decreases caster as the suspension is compressed.

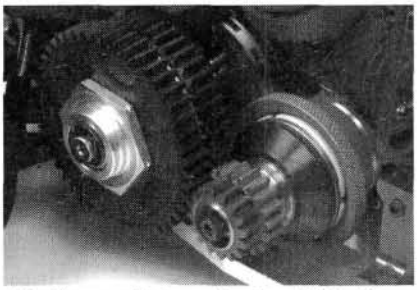
A final—and very clever—element of the Vector's front-end design is the front bumper; toe-in markings are molded into it, so you can determine the toe-in of each rear wheel simply by holding a straightedge against it. Line up the sraightedge with the degree markings, and that's your setting!



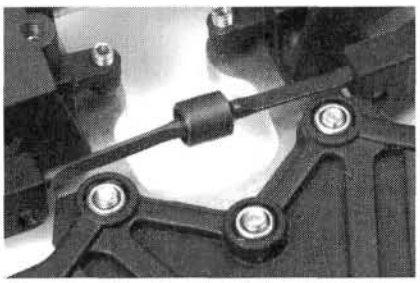
The Vector's wide track enables it to cope with the enormous cornering forces. The drooped front body mounts make it easier to mount GTP-style bodies.



The underside of the chassis is completely smooth. Note the deep recesses for the motor screws. Serpent's CNC work is flawless!



I don't care what your brother did to his Chevelle; the 2-speed-equipped Vector will beat it to 70mph without breaking a sweat. See the ventilated disk brake tucked in there? Believe me, you'll need it.



Simple yet functional, this is actually the front roll bar! The setscrews behind it set the maximum up-travel of the suspension arms.

The Vector's graphite radio tray has the steering servo mounted upside-down, while an included servo-saver actuates the front wheels by means of tie rods; bell-cranks aren't used. A high-speed, high-torque servo is highly recommended, as it's very important that the servo always return precisely to the middle position. This car is capable of high speeds, and inexpensive servos that don't consistently return to the same middle position will make driving it very difficult. In the time it takes to get your steering re-trimmed, the Vector could cover a lot of ground! To protect the servo's delicate innards from vibration, install it on the supplied rubber grommets.

DRIVE TRAIN

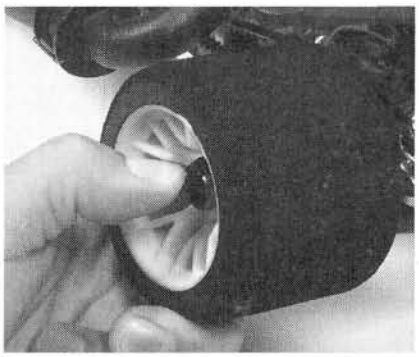
The Vector comes with Serpent's Centax clutch, which can be set anywhere from "mild" (for wet or slippery tracks) to "hard" (for fast, high-traction tracks) by allowing the user to choose the rpm at which the clutch starts to engage.

The Vector's 2-speed is driven by two pinion gears attached to the Centax centrifugal clutch. These gears are available in several ratios, so the Vector can easily be set to run on smaller or larger tracks. Here's how it works: two spur gears are joined on a single layshaft. The first gear drives the layshaft through a one-way bearing, and the layshaft drives the front and rear transmissions. When the 2-speed is ready to shift (you adjust the shift point), two spring-loaded shoes move outward to a point where they "grab" the second gear's clutch bell and engage the second gear. This system allows the use of a low first-gear ratio for good acceleration and a higher second-gear ratio for a higher top speed.

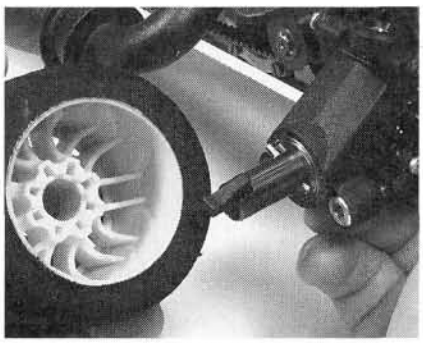
Like many 1/10-scale 4WD cars, the Vector uses toothed belts to transfer the power from the 2-speed tranny to the

front and rear axles. The Vector's belts, however, are considerably more heavy-duty to cope with the incredible power generated by today's potent .21 engines. Although the Vector reviewed here drives both front and rear axles all the time, it could be argued that the car is only part-time 4WD. A one-way bearing in both front hubs allows the front wheels to free-wheel under braking or whenever the front wheels are rotating more quickly than the rears. The rear axle is solid—no differential action at all.

To slow this land bullet, a disk brake keyed to the layshaft is pinched by a cam-actuated caliper. To enhance cooling, the



For once, it pays to be "all thumbs"! Just press the quick-release lever ...



... and slide the wheel off. The Vector sports this quick-release system at all four corners. I wish all cars had this!

disk is of a ventilated design: two plates sandwich an impeller-like center piece. The shape of the center piece actually scoops air into the disk as it turns. Very thoughtful! To be sure there's braking action *only* when you need it, the caliper automatically returns to a centered "off" position when not in use. This eliminates any chance of the brake dragging. The caliper has "fiber" brake pads that make it easy to set the brakes for plenty of stopping power without risking wheel lockup.

The Vector's quick-change wheels are another feature that's unique to 1/8-scale on-road machines. A spring-loaded plastic "tongue" protrudes from each hub and is used to lock the wheel in place when it has been slid onto the axle shaft. The rims

For sheer thrills, it's awesome to have an R/C car that can go from zero to 60mph in a couple of seconds. The Vector is very, very fast and has rocket-like acceleration.

are keyed to engage a cross-pin in the axle. They're attached as firmly as any nut-held wheels, yet can be removed in a split second. Eighth-scale racing requires fast pit stops, so quick-change hubs are a must, and this setup is arguably the best quick-change wheel system on the market. The wheels themselves are Serpent's lightweight, rigid plastic BBS-style wheels. Their lightness reduces unsprung weight and helps make the suspension more responsive. Ideally, as the car goes along a rough track, its sprung parts—chassis, engine, etc.—move forward undisturbed, while the unsprung parts—wheels, axles, etc.—move up over bumps and down into ruts. The less these unsprung parts weigh, the more easily the suspension can follow the terrain.

Likes

- **Everything on the Vector is very accessible for adjusting and cleaning.**
- **Excellent handling; the Vector is nimble and maneuverable.**
- **The setup guide helps you configure the car to suit a variety of tracks.**
- **Easy to work on; you need only a few basic tools to do almost anything.**
- **Excellent front bumper—nice and wide, but also light.**

Dislikes

- **The Vector seems to be quite sensitive to tire size; don't use tires that have been cut down or worn down too much.**

The Vector's foam tires are available in several degrees of hardness; 1/8-scale racers generally have a tire truer on which they trim new tires to the diameter they want after they've mounted them on the rims. On 4WD cars, to get the right overdrive ratio, it's very important to have the proper ratio between the diameters of the front tires and the back tires. This ratio has a huge effect on handling!

Many of the Vector's other features are difficult to see unless you know what to look for. It was designed to have the heaviest components close to the centerline and as low in the chassis as they can be. This makes the car very responsive to driver input.

The rear body mount has wide "arms" to support the rear of the Lexan body and prevent it from being distorted by wind force (at 60mph+, it's getting some wind!), while it transfers the downforce generated by the wind-loading directly to the rear hub carriers. No matter how hard you press on the rear body support, you will not activate the suspension! That leaves the suspension free to do its bit without downforce loading it.

Possibly the Vector's best feature is its adjustability; it was designed to be easy to set up during a race. You can quickly set the up/down stops, ride height, camber, caster, toe-in and clutch engagement.

TEST GEAR

I put a standard .21 Serpent Mega SX-21 engine in my car, but many other .21-size engines will also work with it. When you select an engine, keep your driving skills in mind. If you're highly skilled, go ahead and get the most powerful engine you can afford; but if you're an average racer, a hotter engine might make you slower, not faster. If you pin the boards on every lap because you can't handle the speed, you'll have the slowest laps no matter how hot your motor is!

Don't use inexpensive radio gear with this car. The Vector can easily exceed 80mph; at those speeds, a glitch could be catastrophic. Go for the best radio you can afford. I copied Art Carbonell's choice for his Vector and used a KO* EX-1 Precious radio and servos. Many people like PCM radios for their fail-safe capability; if the receiver loses its signal, the car simply stops.

With an 1/8-scale car such as the Vector, fuel choice is a very important consideration. Do *not* use inexpensive R/C airplane fuel, or you will quickly damage your engine. Fuel usually has a nitro content of anywhere from 20 to 40 percent. If you're starting out, I recommend that you use 20-percent-nitro fuel. When you get faster and more skillful, you might want to go to 30 percent.

The body you choose will have a huge effect, as the downforce it generates is a key factor in the car's performance. I used a Serpent Lola GTP-style body.

Finally, you'll need a starter box to start the Vector's engine. Serpent make a lightweight unit that runs off two 6-cell battery packs and works very well.

PERFORMANCE

At the Snowball Rally in Atlanta, the Vector and I had a great time! My first impression was that it was as easy to drive as my 1/10-scale Serpent Impact 2. It felt like an extension of my mind and hands; whatever I wanted it to do, it did instantly (not always the case with R/C cars). Some 1/8-scale cars I have driven had a tendency to "hold on" to any input you gave them; if you realized you were heading for a

(Continued on page 208)

thrash TEST
1/10 scale electric

TAMIYA Alfa Romeo 155 V6 TI "TL01"

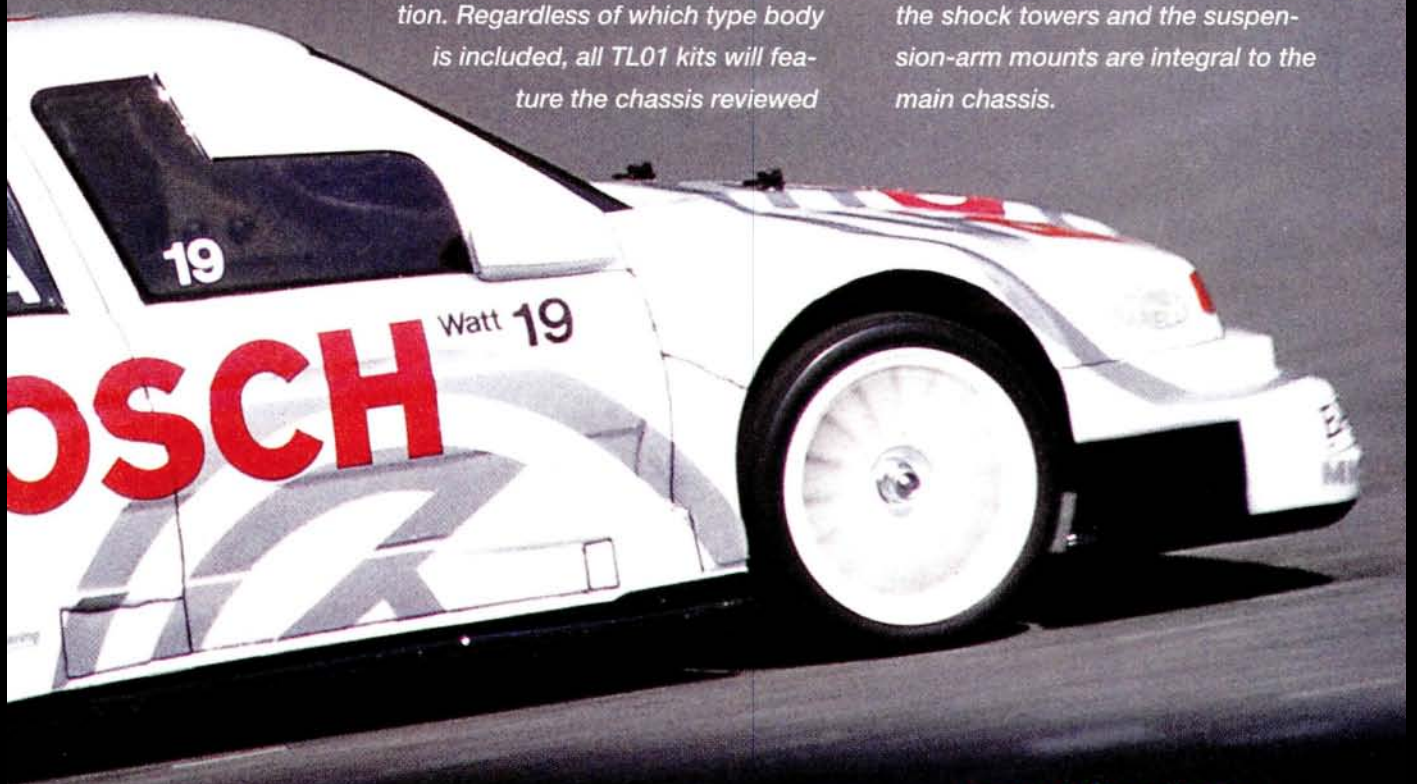
Peter Vieira

FEW COMPANIES HAVE been as important to the R/C car industry as Tamiya. Think about it: Tamiya was the first to produce widely distributed high-quality R/C car kits that were within the reach of average modelers' skills and budgets. Tamiya kits fueled the R/C boom of the early '80s; who didn't have a Hornet, Grasshopper, or Frog? Later, the Blackfoot truck kit transformed the off-road world from buggy dominance to the fat-tire parity we see today. Perhaps most visibly, it was Tamiya that spurred the development of today's 4WD sedan class with their TA01 chassis—a narrowed and retuned version of the Manta Ray 4WD buggy. Since that first entry in the TA series, Tamiya's touring cars and those of its competitors have steadily moved up in cost and complexity. Tamiya would, however, never abandon the "beginner" market they have served so well; in fact, "big T" has developed an all-new chassis aimed squarely at the entry-level hobbyist: enter the TL01.*

First-timer tourer

THE KIT

Once the beautifully decorated box has been cracked open, you'll find the majority of the kit's components stored beneath the clear body shell. Since this is a Tamiya car, it comes as no surprise that the body is an outstanding scale representation of its real-life counterpart—the Alfa Romeo 155 V6 TI in Bosch racing livery. Beginners take note: like all Tamiya touring cars, the alpha-numeric name, "TL01," is the chassis designation. Regardless of which type body is included, all TL01 kits will feature the chassis reviewed here. And what a chassis it is! Instead of the usual tub-type or double-deck plate offerings, the TL uses a two-piece clamshell design that resembles the unibody construction of modern full-scale passenger cars. The chassis is split straight down its centerline and features molded-in steering servo-mounts and bosses for the plastic-bushed front and rear transmission gears; when the chassis halves are joined, the chassis and gearboxes are a one-piece unit. Even the shock towers and the suspension-arm mounts are integral to the main chassis.



specifications

SCALE 1/10
LIST PRICE $142.99

DIMENSIONS
Wheelbase ..... 10.25 in.
Width (F/R) ..... 7.25 in.

WEIGHT (gross, RTR) ..... 3 lb., 6 oz.

CHASSIS
Type ..... Molded "unibody"
Material ..... Molded plastic

DRIVE TRAIN
Type ..... Sealed gear
Primary ..... Pinion/spur
Transmission ..... Dogbone/axle
Differential(s) ..... Bevel-gear type
Bearings/bushings ..... Plastic bushings

SUSPENSION (F/R)
Type ..... Lower suspension arm w/molded upper link
Damping ..... Friction-damped coil-over shocks

WHEELS (F/R)
Type ..... One-piece plastic
Dimensions (DxW) ..... 2x1 in.

TIRES (F/R) ..... Tamiya standard slick

ELECTRICS
Motor ..... Mabuchi 540 sealed endbell
Battery ..... Not included
Controller ..... 3-step mechanical

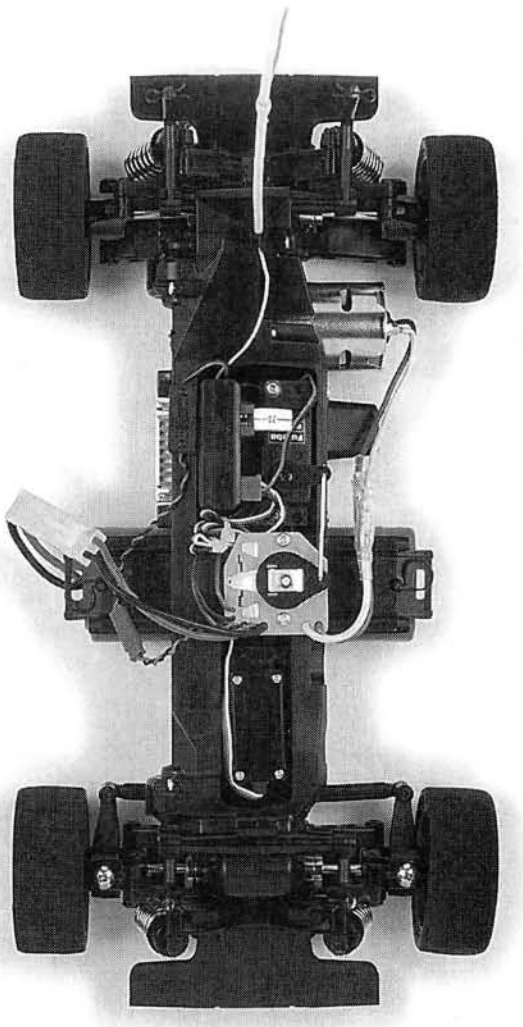
PHOTO BY JOHN HOWELL

Both gearboxes feature Tamiya's rugged bevel-gear differentials, which epitomize the set-it-and-forget-it school of mechanical engineering. To link the front and rear transmissions, a wildly overbuilt steel prop shaft spans the chassis and is driven by a bevel gear at each end. The shaft is almost ¼ inch thick! The rear transmission accepts the included Mabuchi 540 motor, which drives an internal spur gear. Gear mesh is factory set via pre-drilled motor-mounting holes labeled by pinion size; 19-, 21- and 23-tooth pinions may be fitted (the stocker is a 19-tooth).

The motor is mounted ahead of the rear axles, TA02-style, with the battery in front of it. But unlike the '02 and the new TA03R series, the TL01's battery is well ahead—four inches ahead to be exact. The battery tunnels through the chassis much like it does in Tamiya's "M" cars, and similar outrigger supports hold the pack in place. The revised battery-pack placement should help deliver a more balanced chassis and very neutral handling; that sounds ideal for any driver, but especially for a beginner.

The TL01 had better handle well; if it doesn't, the tuning options are limited. The independent front- and rear-suspension systems use non-adjustable upper links, and the steering system also features molded links instead of the adjustable threaded variety. While the molded links reduce costs, speed assembly and ensure symmetrical settings, they can be a great liability if they give the car an oddball setup. Tamiya appears to have the lengths of the links just right; the wheels have about 1½ degrees of camber and a little bit of stability-enhancing toe-in on both front and rear wheels. The steering system itself is unique; the steering servo is mounted upside down in the chassis and is fitted with an oversize servo-saver that acts as a bellcrank to turn the front wheels left and right. This is much easier to assemble than a dual-bellcrank design, and the lower parts count helps reduce the play in the steering system.

Like Tamiya's other sedan models, the TL01 features a coil-over shock at each corner. The TL's units, however, are damped by friction, not oil. To generate damping action, a smooth-shank screw with a button head is pushed and pulled through a lubricated rubber tube within the shock body. The shocks can be surprisingly effective when built properly (see "Building and Setup Tips" for the step-by-step) and are easier to assemble than oil-filled units. The shocks are articulated by lower A-arms that are unique in the sedan world; each arm comprises two pieces held together with a couple of screws. The assembled box-section arms are rugged and stiff. The finishing touch to the chassis is the wheel set, which is typical Tamiya in scale accuracy and quality. My Alfa Romeo 155 V6 TI version sports white, 16-spoke, standard-width wheels with long-wearing standard slicks. Tamiya does not include foam inserts for the tires, but that certainly won't stop anyone from having a lot of fun with the car.



Looks solid, doesn't it? The TL01 packs a lot of features into the chunky monocoque-like chassis.

Building & Setup Tips

Tamiya has yet to drop the ball when it comes to instructions, and the Alfa's manual is no exception. Put on your favorite CD, clear off the bench and enjoy a good build. Here are a few tips to help make your TL01 the best it can be:

- **Get a good screwdriver! Screwdrivers with interchangeable tips are available very inexpensively from your local hardware store. The no. 2 Phillips bit is ideal for Tamiya's self-tapping screws, while a no. 1 bit will handle the smaller screws that retain the body trim pieces.**
- **Find the mechanical-speed-control bag and open it first. Read its separate instructions then note in the main manual the steps where it will be installed; the manual only covers electronic-speed-control installation.**
- **Before you install the steering servo, plug all your radio gear together on the workbench, turn it on and center the servos. If the steering servo's output arm is off-center once the chassis has been assembled, you'll have to tear down quite a bit of the chassis to get at the servo to adjust it.**
- **Despite the instructions' recommendation, don't lube the ends of the dog-bones (steps 15 and 19) as the grease will attract dirt and dust. Dry lube, however, is ideal; Paragon's* Liquid Bearings is a good choice.**
- **To get the best performance from the kit's friction shocks, it is important to trim the rubber damper tubes precisely. Lubricate your hobby knife with a little dish soap to help make a nice clean cut. The goal is to not only get the length correct (as shown in the manual) but to make a nice, straight cut across the rubber—you don't want a beveled tip when you've finished. When assembling the shocks, don't skimp on the grease. That's all there is to it!**

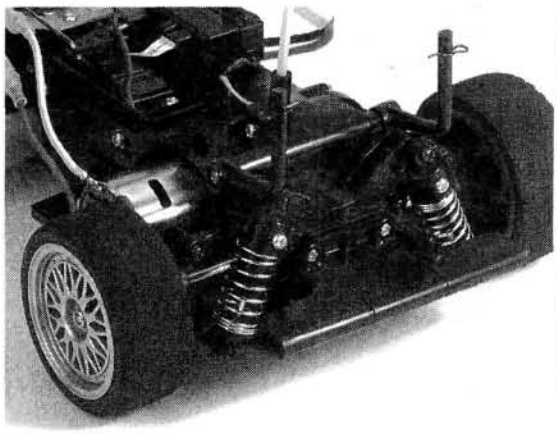
THINGS YOU'LL NEED

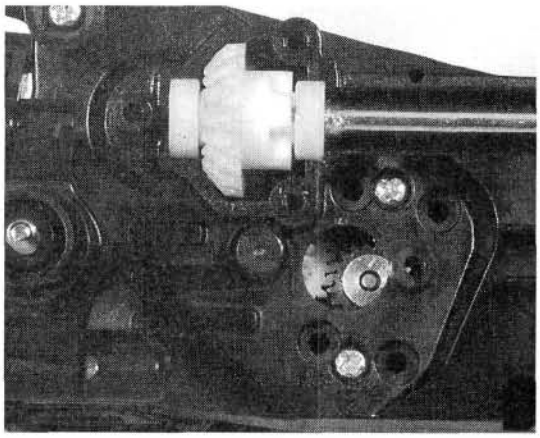
- 2-channel surface radio with two standard servos.
- Lexan-compatible paint.
- 7.2V stick-type battery with Tamiya connector.
- Battery charger.

FACTORY OPTIONS

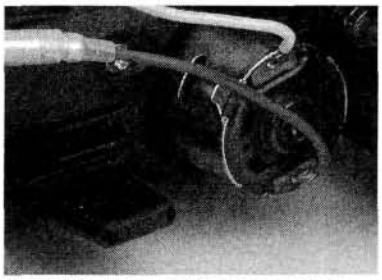
- TL01 ball bearing set—part no. 53292.
- CVA Super Mini Shock set—50746.
- Manta Ray ball differential—53070.
- Tuned spring set—53163.
- TL01 turnbuckle tie-rod set—53300.

TAMIYA ALFA ROMEO 155 V6 TI





Left: is this the front or the rear? That's the bottom of the upside-down steering servo poking out the top, so that makes this the front end. The friction-damped shocks work pretty well. Right: Note the bevel gear drive for the oversize drive shaft and the perfect pinion mesh. Tamiya put those motor-mount holes in just the right spot!



A small "pectoral fin" helps protect the motor from hard knocks.

TEST GEAR

Tamiya equips the TL01 chassis with their standard-issue 3-step mechanical speed control and sealed-endbell stock motor. On some of Tamiya's other sedan kits, the mounting system for the 3-step controller seems a bit of an afterthought. On the TL, the resistor is neatly integrated into the side of the chassis, and the wiper assembly is almost flush with the top—it's the cleanest mechanical installation I've ever seen! You'll need to supply a 2-channel transmitter, a receiver and a couple of servos. I chose Futaba's 2PCKA Magnum Junior and assigned two S3003 servos to steering and throttle duty. Time to play!

A touch of understeer at speed helped keep the back wheels behind the front, while low-speed steering was responsive and precise.

the Competition

	Kyosho Mantis EP	Kyosho EP-10	Traxxas* 4-TEC	Tamiya TL01
Wheelbase	10.2 in.	10.28 in.	10.157 in.	10.25 in.
Width (F/R)	6.25 in.	7.81/7.75 in.	6.89/7.05 in.	7.25 in.
Weight	3 lb., 4 oz.	3 lb., 7.5 oz.	3 lb., 3 oz.	3 lb., 6 oz.
Diff type	Bevel gear	Bevel gear	F/R Ball	Bevel gear
Chassis	Molded space frame	Flat plate w/upper deck	Molded dual-plane***	Molded "unibody"
List price	$279.99	$269	$180	$142.99
Available at*	$129.99**	$124.99**	$110	$85**
Reviewed in	5/97	1/96	—	12/97

**Coming mid-November.*
***Prices vary with location.*
****Upper and lower decks.*

PERFORMANCE

After an enjoyable evening of building the chassis and detailing the striking Alfa body, I was eager to see what this starter sedan could do. The car took to the official *Car Action* test lot with aplomb, scooting around the plastic corner dots with surprising agility, if not blazing speed. With the kit motor, the TL01 won't rip chunks out of the pavement, and you'll want every bit of speed it can offer. In stock trim, however, the TL01 does have plenty of zip for tight-course racing. After all, speed is relative, and a big enough parking lot can make almost any R/C car seem slow. Handling was excellent, not just for an entry-level car but for a sedan of any level. A touch of understeer at speed helped keep the back wheels behind the front, while low-speed steering was responsive and precise. New drivers who use radios without adjustable steering rate will find that the TL01 has a lot of steering and a very tight turning radius. I recommend spending a few extra dollars for a radio with dual-rate steering. Finally, the kit's shocks performed very well; I wouldn't have guessed they were friction units had I not known otherwise.

FINAL THOUGHTS

If you're looking to get into R/C cars with a capable, affordable, easy-to-run sedan, your car has arrived. With its easy assembly and standout quality, Tamiya's Alfa Romeo 155 V6 TI (or any other TL01-based car) is an excellent starting point for the beginner. Scale looks don't hurt, either; Tamiya cars bring an extra measure of reality to our hobby that newcomers seem to especially enjoy. Beginners, however, needn't be the only ones who apply; for the R/C buff of any experience, the TL01 is a fine entry to the sedan scene.

For a very low price, Tamiya delivers a very competent and thoroughly upgradeable chassis. A class for the TL01 chassis is even being added to the Tamiya Championship Series! With the addition of bearings and a hotter motor, my personal TL01 will be my sedan of choice for the daily *Car Action* lunch-hour door-banging sessions. Sure, I've got big-dollar dream cars at my disposal, but the TL handles great and it's bomb-proof; believe me, the key word for the daily *Car Action* 500 is attrition!

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

Likes

- **Tamiya body and decal sheet—the best!**
- **Topnotch Tamiya quality.**
- **Low parts count, easy assembly.**
- **Bomb-proof, low-maintenance design.**
- **Super low price.**

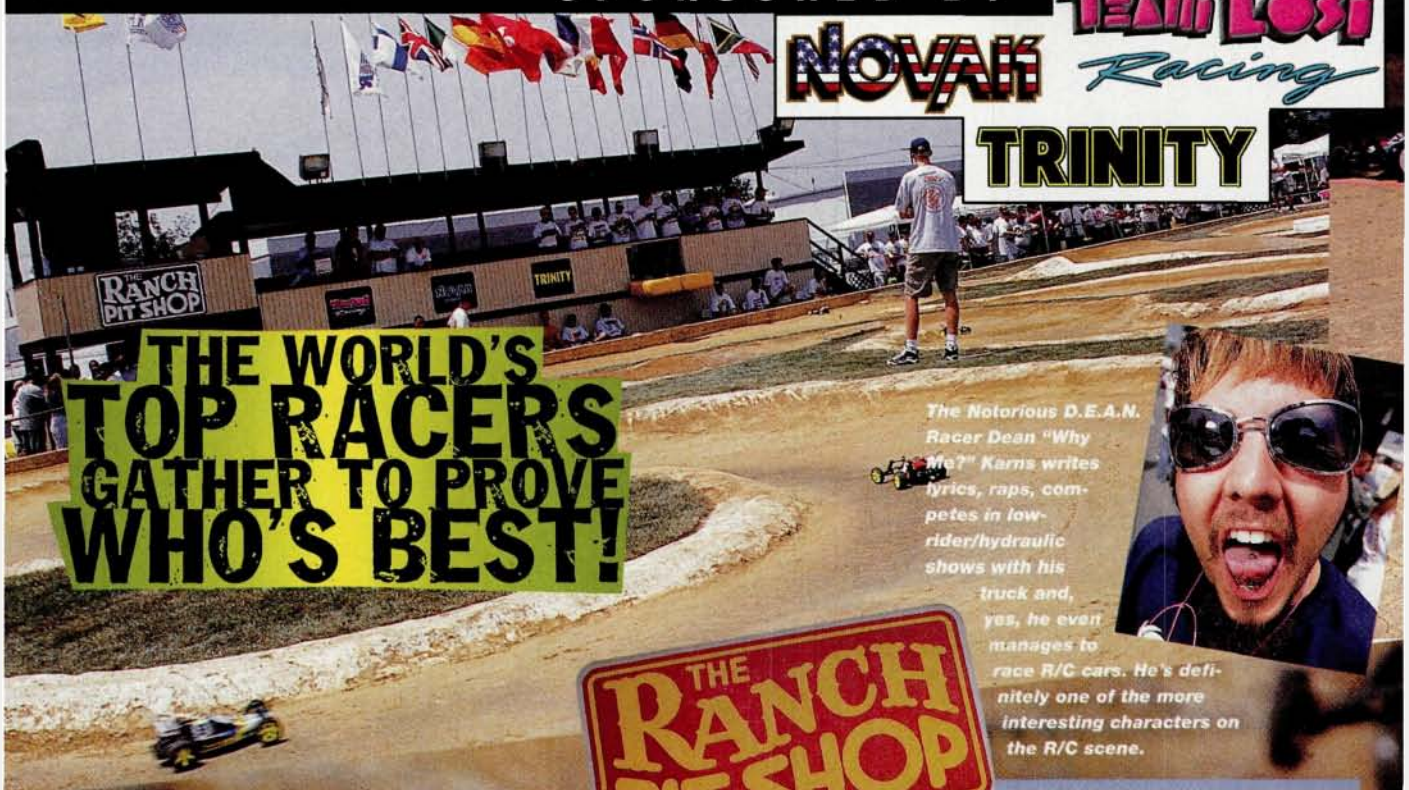
Dislikes

- **Given the kit's intended buyer and low price, nothing to dislike here at all!**

1997 IFMAR OFF-R

SPONSORED BY

NOVAK TEAM LOSI Racing TRINITY



THE WORLD'S TOP RACERS GATHER TO PROVE WHO'S BEST!

The Notorious D.E.A.N. Racer Dean "Why Me?" Karns writes lyrics, raps, competes in low-rider/hydraulic shows with his truck and, yes, he even manages to race R/C cars. He's definitely one of the more interesting characters on the R/C scene.

THE RANCH PIT SHOP

Racers from across the globe assembled at the opening ceremonies and were later greeted with a Mexican-style buffet lunch and a band, thanks to the event's sponsors.

EVERY OTHER YEAR, IFMAR (International Federation of Model Auto Racing) crowns the fastest 2WD and 4WD off-road racers in the world. Drivers come from all over the globe—from Asia, Europe, Australia, South Africa .... If a country has R/C car racing, more than likely, one of its drivers will represent it at this event.

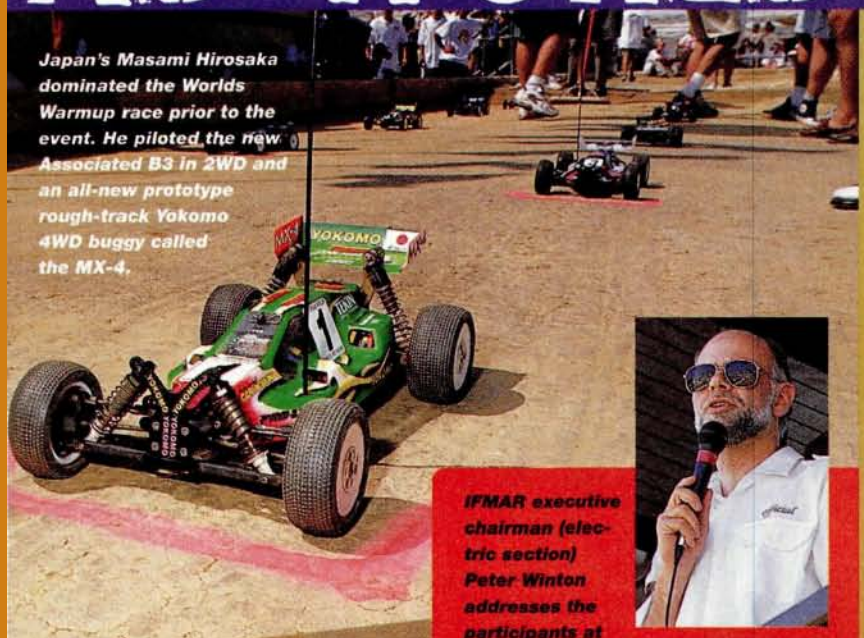
This time, the Worlds were held this August in sunny Southern California at the Ranch Pit Shop in Pomona. Most participants expected the track to be a sauna, but luckily for all those involved, the weather was excellent during the entire event. Though it wasn't as hot as it had been the week before (we were informed that it had been well over 100 degrees), the action on the track certainly was hot enough.

This event featured a new twist. IFMAR adopted a new qualifying system—best three out of five rounds. This eliminated the unfair "rocket round," in which unusual track conditions favor a particular round of qualifying, nullifying the times posted during the other rounds. So under the new system, being consistently fast paid off. Let's check in on who were the fastest of the fast.

Team Losi/Team Trinity's Brian Kinwald was on top of his game in the 2WD portion of the event.

AD WORLDS

Story and photos by
John Howell

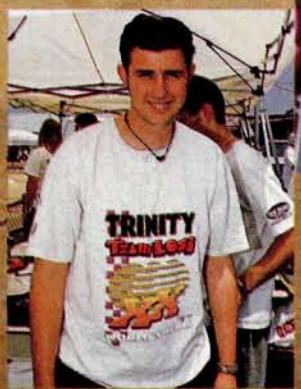


Japan's Masami Hirosaka dominated the Worlds Warmup race prior to the event. He piloted the new Associated B3 in 2WD and an all-new prototype rough-track Yokomo 4WD buggy called the MX-4.

IFMAR executive chairman (electric section) Peter Winton addresses the participants at the opening ceremonies. Peter, who has done an excellent job for IFMAR over the years, sadly announced at the award banquet that he would step down from his position and that IFMAR was looking for a replacement. Thanks for all your help and hard work over the years, Peter. It never went unnoticed.

Right: as you can see by the stickers, Team Losi and Team Trinity went into this event fully charged and ready to go. This has been their best year in off-road so far, and they had a good shot at finally taking home an IFMAR off-road title together.

Above: IFMAR on-road champ Mike Swauger (left) was on hand during the Mains to serve as a referee on the drivers' stand. If you "got out of line," Mike made sure you "got back on track."



IFMAR on-road champ David Spashett made the journey to Pomona to help his sponsor, Team Trinity, with motor work. If the team guys wanted horsepower, they went to him.

Right: the event's proud sponsors take some time to pose for the Car Action camera. From left to right: Gil Losi Sr., Bob Novak and Trinity's Ernie Provetti.

The bbk Scoring System
It's about time...

FYI, here's the 411 on the bbk Scoring System. It tells you whether you've TQ'd or DNF'd, and it lets you know PDQ and ASAP.

At this year's IFMAR World Championships, a new timing/scoring system quickly grabbed everyone's attention. In a word, it's hardcore. Read on to learn more about it and its maker, Rob Nelson.

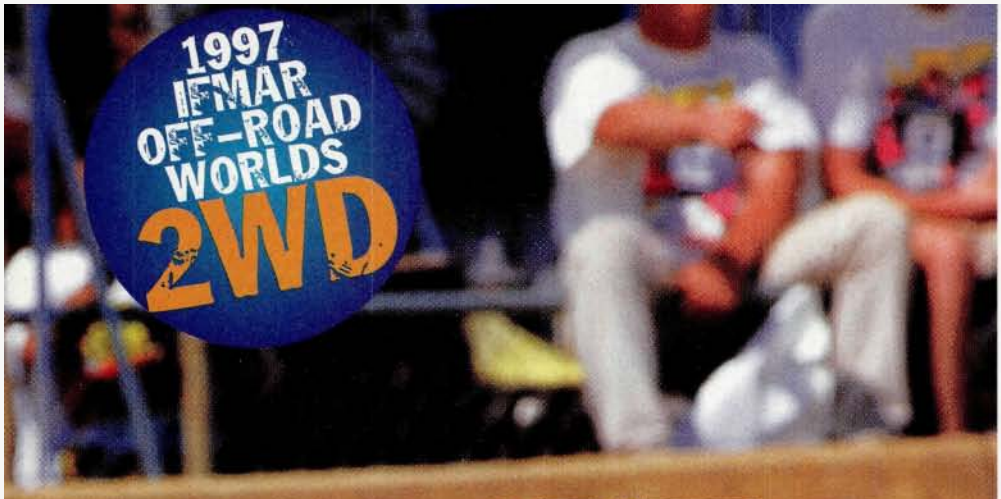
Nelson resides in England and first got involved with model car racing in the winter of 1983-'84, when he bought his eldest son a Tamiya Grasshopper. Nelson himself started racing with an AYK Sidewinder, RC10 and SWB CAT, tried 1/12-scale MiniStox and finished up with a 1/5-scale gas Mercedes 190 Evolution. His best finish was third in the 1993 *Performance Car* magazine series for large-scale touring cars. Since his two sons have stopped racing, he has "hung up his thumbs." (The real reasons are that he's better at writing computer software for racing, he enjoys watching experts race, and he didn't enjoy watching his own driving.) Nelson, an independent IT consultant, first wrote race control software in 1987 after his club persuaded him to set up a timing computer and he was appalled by the quality of the software they had. In 1990, the British Radio Car Association (BRCA) asked him to design a system to run the UK National Championships. The system was a success, and by the following year, about 12 UK clubs had bought it. This nucleus of users and the BRCA committee made various suggestions about features, and by 1993, the system was being used extensively in the UK for events ranging from European championships to club meetings. That year, the IFMAR 1/10-Scale Off-Road Worlds went to the UK, and DRIVERS (Distributed Race Information and VERification System) made its debut.

Losi's Jack Johnson (left) with bbk creator Rob Nelson.

Features of the early race control system included a driver database that contained names, crystals, ability, etc. The key to the database is a number from 1 to 60,000 that corresponds to the national association membership number. This means driver details can be referenced from the ROAR membership number, for example. In the UK, the program keeps track of the national driver ability grading system. The system can set up races and automatically assign drivers to heats based on their ability in up to 10 classes (including different scales), and it can run the heats in automatic mode so that races start according to a timetable—essential with large numbers of entries. Finals can be sorted using a variety of qualifying

(Continued on page 125)

1997 IFMAR OFF-ROAD WORLDS 2WD



Team Associated's Mark Pavidis (pictured above) jumped to the front of the pack in the first of three A-Mains and battled against Masami Hirosaka until the very end. Pavidis crossed the line a few car lengths ahead of Hirosaka to claim the first win of the event.

Trinity's Ernie Provetti, Team Losi's Pops Losi and Novak's Tyree Phillips react as Kinwald crosses the finish line after clinching the title in the third and final Main.

QUALIFYING

After bouncing back and forth, in and out of the top position, Japan's multi-world champ Masami Hirosaka finally nailed down the TQ spot after five rounds. He piloted his new Team Associated B3 to the front with help from Reedy motors, Yokomo batteries, KO Propo radio gear, a Tekin M-Star Red ESC and Team Losi tires front and rear.

Only five racers joined the élite 13-lap club during qualifying: Hirosaka, Greg Hodapp, Brian Kinwald, Scott Brown and reigning champ Matt Francis. Going into the mains, the field was level with five Associated B3s and five Losi Double-Xs.

With Hirosaka in the pole position, the rest of the field consisted of

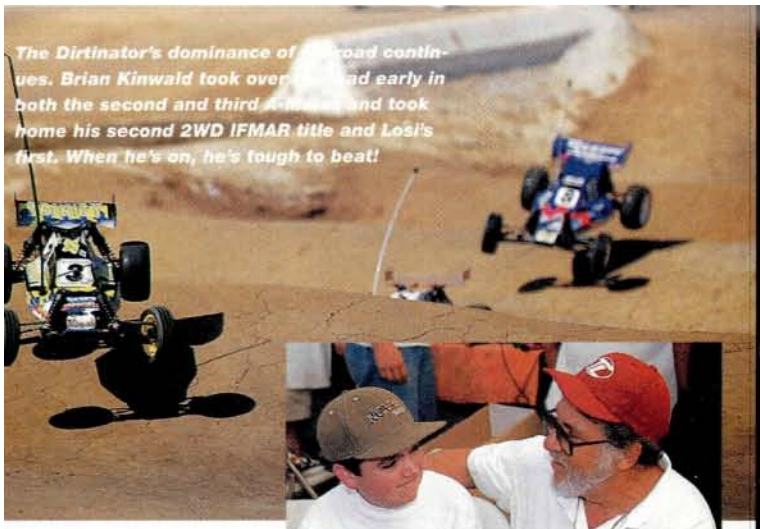
2. Greg Hodapp (Team Losi/Trinity)
3. Brian Kinwald (Team Losi/Trinity)
4. Scott Hughes (Team Associated/Reedy)
5. Scott Brown (Team Losi/Trinity)
6. Mark Francis (Team Associated/Reedy)
7. Jason Ruona (Team Associated/Reedy)
8. Mark Pavidis (Team Associated/Reedy)
9. Brian Dunbar (Team Losi/GM Racing)
10. Gabe Boudreau (Team Losi/Trinity)

2WD MAINS

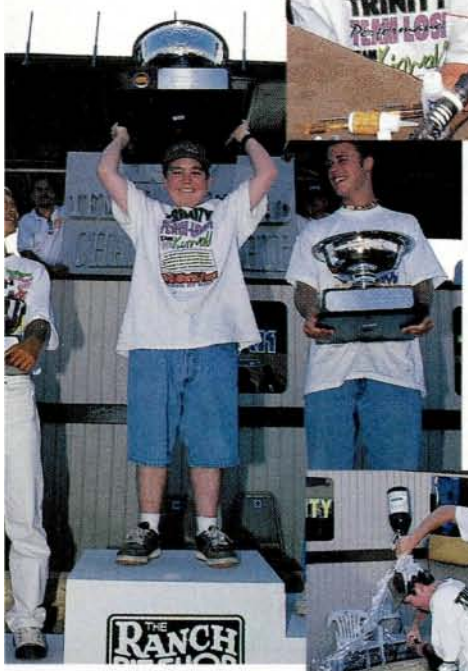
A1

At the start, Hirosaka and Hodapp jumped into the lead. Not too far into the race, they tangled over the far tabletop, and Hirosaka took the lead. Many questioned the move he made to gain the lead (see photos). Shortly afterward, Pavidis moved into second, and Hodapp dropped to fourth as Scott Hughes also passed him. Kinwald, who hadn't made the greatest start, was in fifth. Entering the rear section of the track, Jason Ruona's car traction-rolled and broke. Meanwhile, while going over

(Continued on page 116)



The Dirtinator's dominance of off-road continues. Brian Kinwald took over the lead early in both the second and third A-mains and took home his second 2WD IFMAR title and Losi's first. When he's on, he's tough to beat!



Above: an overjoyed Pops Losi congratulates Kinwald on his win. Team Losi has been close to the "big" win over the years, but it has always mysteriously eluded them. Their time has finally come. Below: Second overall finisher Brian Dunbar congratulates his Losi teammate.

Kinwald, flanked by second-place finisher Brian Dunbar and Masami Hirosaka, who took third overall, shows the crowd who's the man!

Keep an eye out for this racer. We're sure you'll see him on the winners' podium again very soon.

Right now, Greg Hodapp can be heard somewhere saying, "Doh!" During the 2WD portion of the event, he repeatedly had problems with Masami Hirosaka tagging him and was, to put it mildly, disappointed with the former world champ's "driving tactics."

Catching up with Kinwald

The 2WD Champ speaks out...

At the 1997 IFMAR 1/10-Scale Off-Road Championships, Brian Kinwald was crowned 2WD world champion. He battled against the nine best drivers in the world and not only took the title, but also boasted the fastest qualifying run and the fastest single main event time in the finals. Kinwald is no stranger to the winners' podium. He has taken more national titles than anyone else and was crowned a world champion once before, back in 1993 in Basildon, England. So what does it take to become a world-championship-winning driver? How does Kinwald continue to stay on top? What does the future hold for this seemingly unbeatable R/C driver?

Car Action: How many years have you been racing R/C cars?
Kinwald: About nine.

Car Action: Was winning the 2WD world championship title at this year's IFMAR Worlds as gratifying as your win back in 1993?
Kinwald: I would have to say that this year's win was more gratifying simply because of the fact that it was Losi's first world championship win, and also because I've never had very good luck at the Ranch. It was nice to finally turn that around.

Car Action: In the 4WD class at the World Champs, you would have been the third qualifier using the old qualifying system. In fact, you would have been TQ in 2WD using that system. What do you think of the new point system qualifying method used at the Worlds?
Kinwald: I think it depends on the track. If the track conditions change a lot, then I think this new system is better. But if the track conditions stay consistent, then single round is just as good.

Car Action: Other countries use a series of races to determine national champions. Would you like to see that kind of system used in the U.S. as well?
Kinwald: I think that every big title should be determined by at least four races. For example, a national championship could be determined by a four-race series with races in different parts of the country. The world championship title, in my opinion, should be determined by, say, six races held in different parts of the world.

Car Action: Speaking of national events, you've had a remarkable year—TQ'ing and winning all three classes at the ROAR Modified Nats,

(Continued on next page)

Kinwald *(Continued from previous page)*

winning 2WD at the Worlds and now TQ'ing and winning all three classes at the NORRCA Nats. Would you say this has been the best year of racing you've ever had?
Kinwald: Yeah! It has to be.

Car Action: Drivers have come and gone, but it seems that you've been at the top longer than most of them. How do you stay motivated and keep from burning out?
Kinwald: I guess just by doing badly. Whenever I do badly, it makes me work twice as hard to get back on top. It makes me more determined. It makes me want to find out how to go fast again.

Car Action: Out of all the tracks all over the world on which you've raced, which was your favorite?
Kinwald: I'd have to say Yatabe Arena in Japan back when you were allowed to run foam tires.

Car Action: So you're talking about prior to the 1995 Worlds?
Kinwald: Yeah. That was ridiculous speed! Of course, whenever else I've been there, it's also been the best track.

Car Action: Who would you say were the most influential people in helping you reach the top level?
Kinwald: Really, there are too many to name. Pretty much everybody I know and have ever raced with. When I first started racing, I'd have to say Cliff Lett because back then, I didn't know anything. I wanted to learn, and he was the one who would sit down with me and help me.

Car Action: It seems that lately, there are more sponsored drivers than there have ever been. Do you think there are too many now? Has it gotten out of control?
Kinwald: It's hard to say. I'm not really that aware of how these things affect a company, so I can't really say whether it's good or bad. I just concentrate on racing.

Car Action: How many more years do you see yourself racing?
Kinwald: Forever.

We thank Brian for taking the time to talk to us, and we congratulate him on capturing his second 2WD IFMAR World Championship.

IFMAR OFF-ROAD WORLDS
(Continued from page 114)

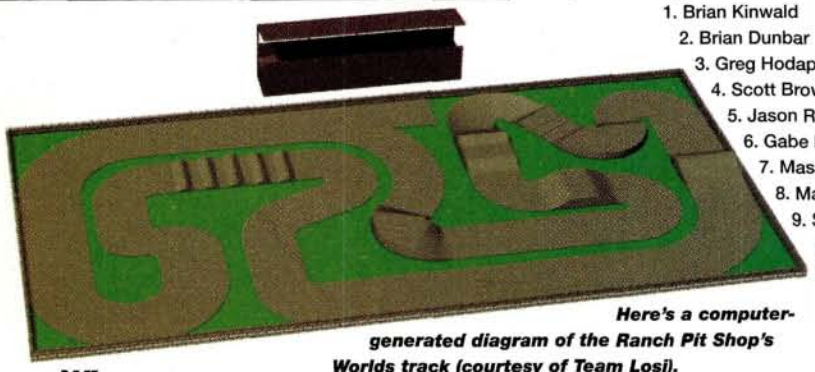
the tabletop, Hirosaka rolled it, and Pavidis slid by with 1:30 to go. Hughes was still in third, but now, he was closely followed by Hodapp and Kinwald. With time running out, Hirosaka tried to go to the outside of Pavidis on the very last turn before the timing loop, but Pavidis held on for the win.

1. Mark Pavidis
2. Masami Hirosaka
3. Scott Hughes
4. Scott Brown
5. Brian Kinwald
6. Gabe Boudreau
7. Greg Hodapp
8. Mark Francis
9. Brian Dunbar
10. Jason Ruona (DNF)

A2

At the start, Hirosaka and Hodapp tangled again (Hirosaka hit him coming out of the first S-turn before the doubles), then Hirosaka traction-rolled right before the doubles, and Kinwald went by for the lead. Brown inherited second, and Pavidis found himself in third. He started to pressure Brown and then spun out. Brian Dunbar, who had been making his way through the pack, took over third. At this point, Kinwald had a ½-second lead over Brown. Dunbar, who was closing quickly on the leaders, passed Brown on the inside over the corner tabletop right before the start/finish line. Dunbar was close to Kinwald and within striking distance. The two now had a 5-second lead over everyone. Toward the end of the race, Dunbar rolled his car over after the tabletop and gave Kinwald some breathing room. He stretched that out and finished comfortably ahead of the pack. Dunbar took second, and Hodapp finished third.

1. Brian Kinwald
2. Brian Dunbar
3. Greg Hodapp
4. Scott Brown
5. Jason Ruona
6. Gabe Boudreau
7. Masami Hirosaka
8. Mark Francis
9. Scott Hughes
10. Mark Pavidis



Here's a computer-generated diagram of the Ranch Pit Shop's Worlds track (courtesy of Team Losi).

A3

Hirosaka jumped out to the lead, but Kinwald quickly slid under him at the first S-turn, and Hughes followed him. At the turn at the end of the far straightaway, going toward the tabletop, Hughes tried to go for an inside pass on Kinwald, rolled his car and, in turn, took out Hirosaka, who was following in third. Mark Francis took over second place, followed by Dunbar. Francis rolled his car shortly afterward and let Hirosaka and Boudreau go past. Hirosaka was all over Boudreau's rear bumper, and over the tabletop, they got together slightly. This pushed Boudreau off-course, and he rolled his car down the back face of the tabletop and dropped to fourth. At this point, the top three—Kinwald, Dunbar and Hirosaka—were moving away from the pack. Then Kinwald and Dunbar began to pull away from Hirosaka, and with 1:30 to go, Dunbar was all over Kinwald as if to just show him that he was there. With 30 seconds left, Kinwald cruised on to take the win and clinch the championship!

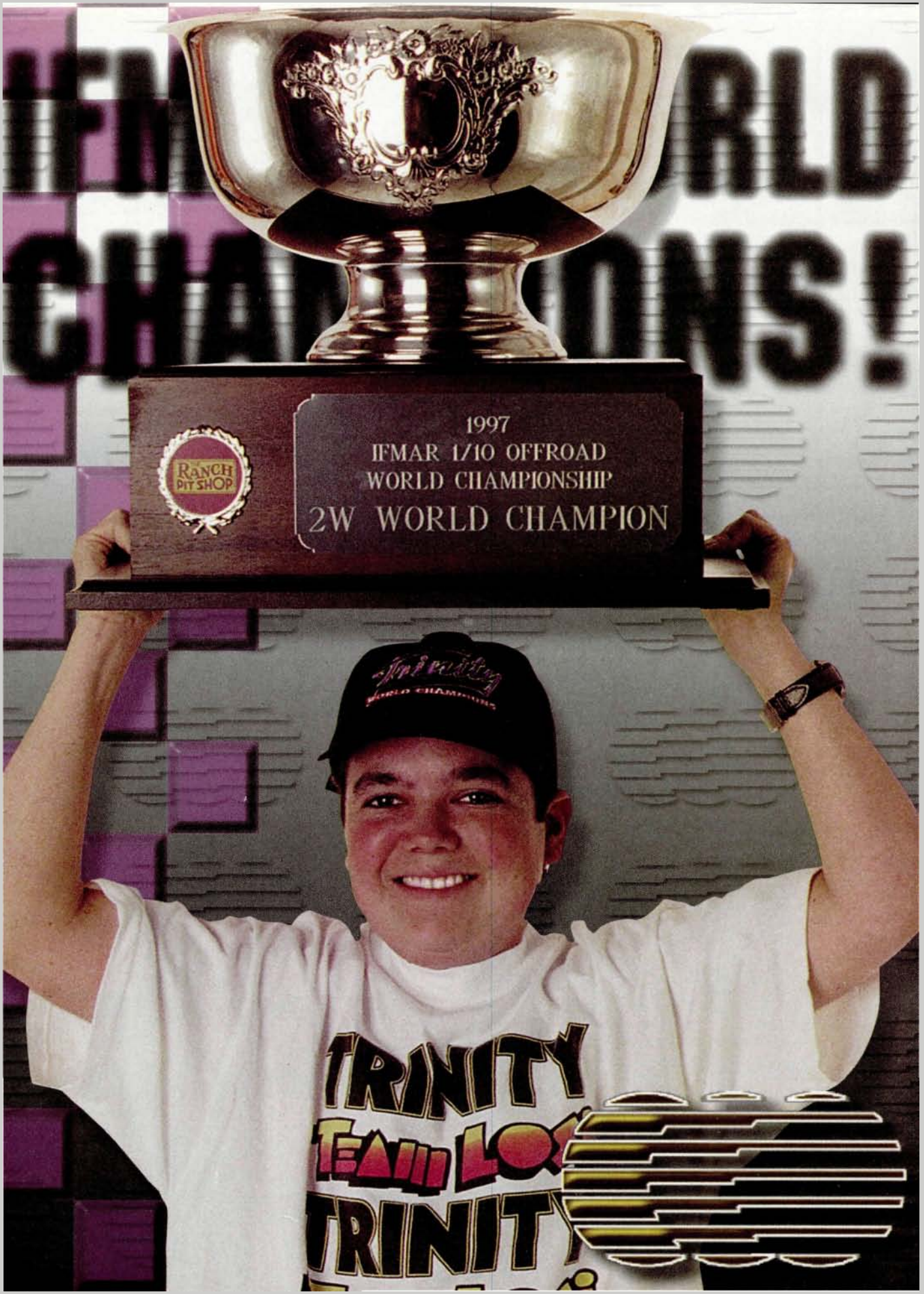
1. Brian Kinwald
2. Brian Dunbar
3. Masami Hirosaka
4. Scott Hughes
5. Jason Ruona
6. Gabe Boudreau
7. Scott Brown
8. Greg Hodapp
9. Mark Francis
10. Mark Pavidis

Top Laps! So who was the fastest of the fast when it came down to race time? Let's take a look at the top 20 laps

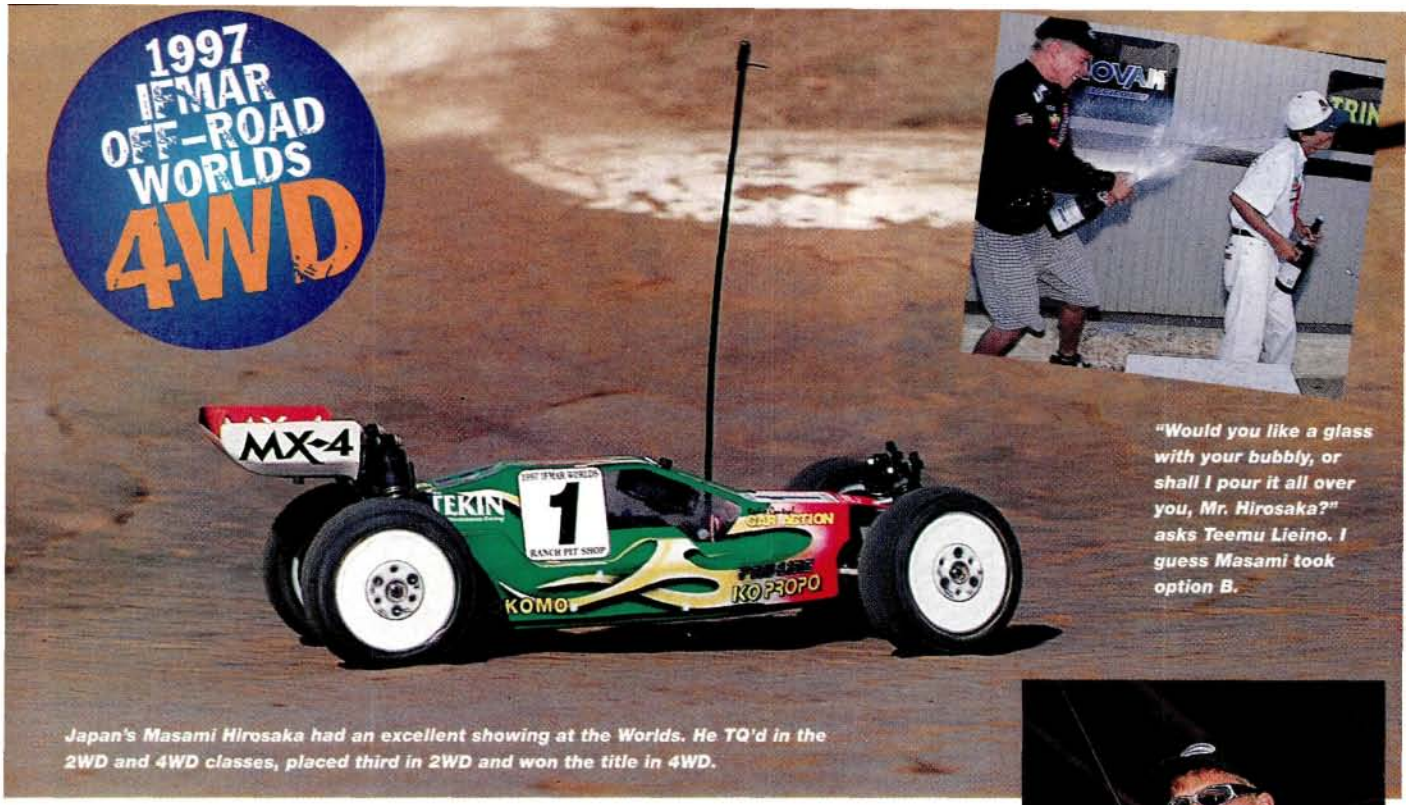
	Race	Lap	Driver	Time
1.	A-2	9	Masami Hirosaka	24.12
2.	A-2	12	Masami Hirosaka	24.14
3.	A-2	10	Masami Hirosaka	24.19
4.	A-2	11	Scott Hughes	24.22
5.	A-2	6	Jason Ruona	24.27
6.	A-2	9	Scott Hughes	24.36
7.	A-2	10	Brian Dunbar	24.36
8.	A-2	11	Brian Kinwald	24.38
9.	A-2	10	Brian Kinwald	24.46
10.	B	12	Jimmy Johnson	24.47
11.	A-2	11	Masami Hirosaka	24.48
12.	A-2	8	Scott Hughes	24.49
13.	A-1	5	Greg Hodapp	24.50
14.	A-2	11	Mark Francis	24.50
15.	A-2	8	Gabe Boudreau	24.50
16.	A-2	8	Scott Brown	24.51
17.	A-2	12	Brian Kinwald	24.52
18.	A-1	5	Brian Dunbar	24.53
19.	C	7	Jimmy Babcock	24.54
20.	A-1	6	Brian Dunbar	24.55

Winners

Fin.	Qual.	Driver	Nation	Chassis	Motor	Battery	ESC	Tires(F/R)
1	3	Brian Kinwald	USA	Losi Double-X 'CR'	Trinity 13x6	Trinity EX-TECH	Novak Cyclone	Losi Wide/Losi X-2000
2	9	Brian Dunbar	USA	Losi Double-X 'CR'	GM EV02 12x4	GM VIS	Novak Cyclone	Losi Wide/Losi X-2000
3	1	Masami Hirosaka	Japan	Associated RC10B3	Reedy 10x2	Yokomo	Tekin M-Star Red	Losi Wide/Losi Sprint
4	4	Scott Hughes	USA	Associated RC10B3	Reedy 11x5	Reedy/Orion	LRP IPC V6	Losi Wide/Pro-Line Holeshot
5	5	Scott Brown	USA	Losi Double-X 'CR'	Trinity 13x5	Trinity EX TECH	Novak Cyclone	Losi Wide/Losi X-2000
6	2	Greg Hodapp	USA	Losi Double-X 'CR'	Trinity 14x3	Trinity EX TECH	Novak Cyclone	Losi Wide/Losi X-2000
7	7	Jason Ruona	USA	Associated RC10B3	Reedy 10x4	Reedy/Orion	LRP IPC V6	Losi Wide/Pro-Line Holeshot
8	8	Mark Pavidis	USA	Associated RC10B3	Reedy 11x2	Reedy/Orion	LRP IPC V6	Losi Wide/Pro-Line Holeshot
9	10	Gabe Boudreau	USA	Losi Double-X 'CR'	Trinity 13x3	Trinity EX TECH	Novak Cyclone	Losi Wide/Losi X-2000
10	6	Mark Francis	USA	Associated RC10B3	Reedy 11x2	Reedy/Orion	LRP IPC V6	Losi Wide/Pro-Line Holeshot

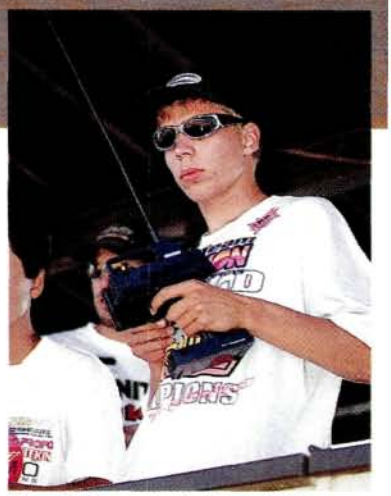

1997
IFMAR 1/10 OFFROAD
WORLD CHAMPIONSHIP
2W WORLD CHAMPION
RANCH PIT SHOP
TRINITY

1997 IFMAR OFF-ROAD WORLDS 4WD



Japan's Masami Hirosaka had an excellent showing at the Worlds. He TQ'd in the 2WD and 4WD classes, placed third in 2WD and won the title in 4WD.

"Would you like a glass with your bubbly, or shall I pour it all over you, Mr. Hirosaka?" asks Teemu Lieino. I guess Masami took option B.



Team Schumacher's Teemu Lieino, from Finland, showed everyone that he was a contender when he won the third and final A-Main.

QUALIFYING

Talk about a man on a mission! After five rounds of qualifying, Masami Hirosaka, surprising no one, TQ'ed with Yokomo's brand-new prototype MX-4. He took it to the top with help from Yokomo batteries, Reedy motors, a Tekin M-Star Red ESC, KO Propo radio gear and Team Losi tires front and rear.

The evenly matched field consisted of four Yokomo MX-4s, three Losi XX-4s, two Schumacher Cat 2000s and one Tenth Technology Predator.

With Hirosaka in the pole position, the rest of the field consisted of

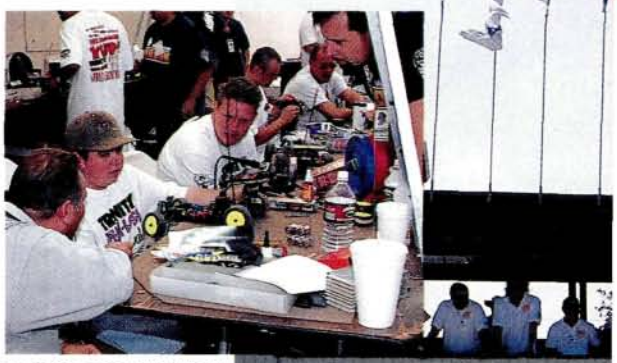
2. Mark Pavidis (Team Associated/Yokomo)
3. Teemu Lieino (Team Schumacher/Corally)
4. Jukka Steenari (Team Schumacher/Corally)
5. William Mitcham (Team Tenth Technology/Maxtec)
6. Greg Hodapp (Team Losi/Trinity)
7. Billy Easton (Team Associated/Yokomo)
8. Craig Drescher (Team Associated/Yokomo)
9. Rick Hohwart (Team Peak Performance/Losi)
10. Matt Francis (Team Losi/Trinity)

4WD MAINS

A1

TQ Hirosaka jumped out to an early lead, followed by Pavidis, Steenari and Francis, who launched through the rest of the pack from his 10th-place starting position. Shortly into the race, Hirosaka had a 1-second lead over everyone. Drescher worked his way through the pack to fifth place. With 3 minutes left, Steenari was all over Pavidis. Drescher moved up to fourth after Francis momentarily found himself on his lid. While going over the tabletop, Steenari passed Pavidis, but Pavidis quickly passed him back while entering the tiny straight. The race was now a battle for second, as Steenari and Pavidis went toe to toe! On the next lap, Hirosaka bobbled over the triples, but neither Pavidis nor Steenari was close enough to capitalize. Approaching the triples, Steenari cased it and gave Pavidis a few extra feet and some breathing room. Immediately after the triples, Steenari's car got light in the rear, and he spun in the rhythm section and gave Pavidis more room. Pavidis was now 1.5 seconds behind Hirosaka with a minute to go. But on the very next lap, Pavidis spun out after the triples and then got on his lid while going through the rhythm section. This allowed Steenari to catch up and Hirosaka to pull away even farther. Steenari and Pavidis traded paint and banged and bumped quite a bit, but Pavidis got the best of it as they went over and past the tabletop. They went at it again at the rhythm section, tangled, and Pavidis again came out in front. Steenari was all over him but just couldn't get past. With time running out, Pavidis crossed the line in second while Steenari got hung up on the very last turn and finished third.

(Continued on page 120)



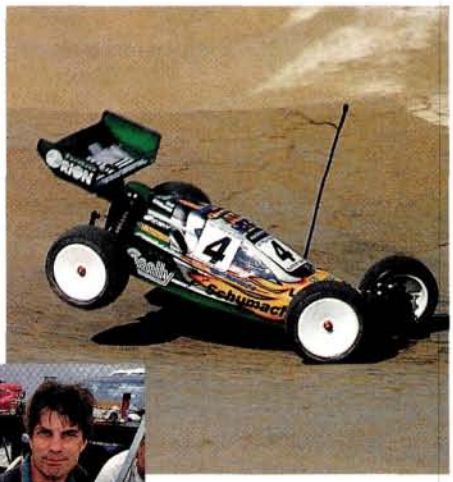
Brian Kinwald was plagued with problems throughout the 4WD portion of the event. He had radio difficulties in the beginning and then during what had been a smooth run, a wheel fell off his car. If that weren't enough, the newly crowned 2WD champ was on a TQ run when he snapped a rear bulkhead. That DNF was the last straw, and it put him out of contention.

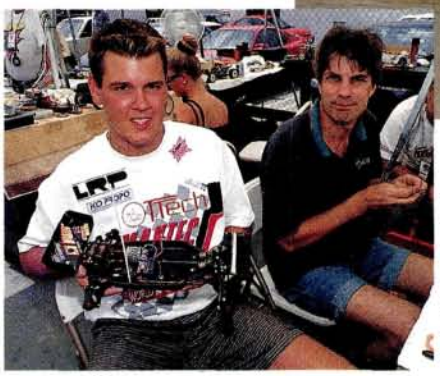
A moment with Masami

The 4WD Champ has a few words...

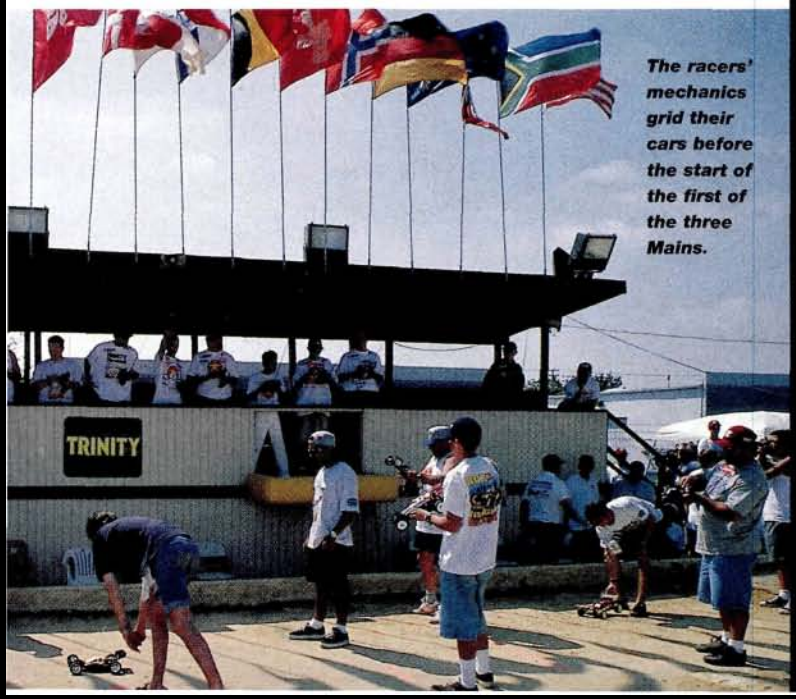
Masami Hirosaka is one of the fastest R/C racers on the planet, so it was hard to catch up with him for this interview ... OK, bad joke. What is not a joke, though, is that Hirosaka is considered a national hero to R/C racers in Japan. He has so many world and national titles to his credit (in on-road and off-road categories in various scales) that it's hard to keep track of all of them. He is also one of the most polite individuals you'll ever meet off the track—and one of the fiercest competitors on the track.

Above: Team Yokomo's Masami Hirosaka proudly stands with his TQ and first-place trophies. He's flanked by Schumacher drivers Jukka Steenari (second) and Teemu Lieino (third). Right: Finland's Jukka Steenari had the fastest Schumacher at the event. His epic battle with Mark Pavidis for second place in the first of the three A-Mains was a classic race to the finish.





Team Tenth Technology driver William Mitcham (left) and car designer Richard Weatherly prepare in the pits before the first of three A-Mains. Mitcham finished a respectable fifth overall in the event.



The racers' mechanics grid their cars before the start of the first of the three Mains.

Car Action: Congratulations on winning the 4WD title. It must be very satisfying to take the new Yokomo MX-4 to victory its first time out. How would you rate this win compared with your other championship-winning races?
Hirosaka: Thank you. I can say that I'm so happy to have been able to win this one because the level of the Worlds gets higher each year, which makes it tougher to win. I feel that winning at the competitors' home track made it even more valuable.

Car Action: Can you give us an overview on the differences between the new Yokomo MX-4 and its predecessor?
Hirosaka: The MX-4 is much better on tracks with bumpy sections and a lot of jumps than the YZ-10.

Car Action: How do you think the race was run? How does it compare to world championships of the past?
Hirosaka: I think the crew at the Ranch Pit Shop did a great job keeping the event enjoyable and successful, although banning the banners around the pit/track area and selling video shooting rights to a sole contractor wasn't a cool thing to do, whoever's decision it was. I know of one video production company and two TV stations that were supposed to come all the way from Japan and report on the event, but they had to cancel the whole plan because of that. To me, it was really discouraging, and I just couldn't believe the event had to go in that direction.

Car Action: Including this win, how many IFMAR titles do you have?
Hirosaka: Nine.

(Continued on next page)

Masami *(Continued from previous page)*

Car Action: What did you think of the new qualifying format? If you could have changed anything about it, what would it have been?
Hirosaka: I thought it was fairly agreeable and well-planned.

Car Action: What is next for you and Yokomo?
Hirosaka: I guess to win another Worlds title for Pro-Ten next year.

Car Action: There were some rumors going around at the track that you were contemplating an early retirement from racing. Will we see you competing at the next off-road world championship event?
Hirosaka: Oh yes!

Car Action: What do you think of the new Associated B3? How does it compare to the B2?
Hirosaka: It felt more suitable for bumpy, rough tracks than the B2 did, and it was easier to run.

Car Action: Is there anything you'd like to say to your many loyal fans?
Hirosaka: I'm sure some are more serious about racing while others are simply having fun, maybe as family recreation. I just hope everyone enjoys R/C cars, no matter how you are involved with it!

We thank Masami for his time and congratulate him on capturing yet another IFMAR Worlds title.

BAN THE BANNERS?

At most races, you see companies' banners flying throughout the track area, the drivers' stand and the pit areas. At the IFMAR Off-Road Worlds, however, the only banners present were those of the event's three sponsors—Trinity, Team Losi and Novak Electronics. No others were allowed anywhere. Representatives from a few companies that did not sponsor the event said they were very disappointed that they were not able to put their banners in the pits. Some pointed out that banners help fans find their favorite drivers. Others said some teams spend a great deal of money to send their drivers overseas to compete, and they deserve recognition for their efforts.

To find out a bit more about the decision about the banners, we spoke to a representative from one of the three sponsoring companies, and this is what he had to say: "The industry and the hobby have changed from when we were all in parking lots at no cost just hanging banners, etc., to attract people. Not only do the IFMAR World Championships and other major events like this cost an enormous amount of money to host, but also, it is the responsibility of the R/C car industry to promote a professional, well-run event. In an effort to do this, the Ranch Pit Shop sought out three sponsors to not only pay for the entire event, but to represent the event in a professional manner."

He went on to say that for manufacturers, R/C is a business, not a hobby, and that sponsors who contribute large amounts of money to events deserve top billing. "Do you think Coca-Cola would be sponsoring the Coca-Cola 500 at NASCAR events if there were Pepsi signs over the whole track because Pepsi gave out free soda? This would not be fair to the major sponsors," he added.

So what do you think, racers? Should other companies have been allowed to hang their banners at the track? Drop us a line, or email us with your opinions. We'd like to hear from you! Write to "Letters," *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606; johnh@airage.com.

IFMAR OFF-ROAD WORLDS

(Continued from page 118)

1. Masami Hirosaka
2. Mark Pavidis
3. Jukka Steenari
4. Craig Drescher
5. Matt Francis
6. Greg Hodapp
7. Billy Easton
8. William Mitcham
9. Teemu Lieino
10. Rick Hohwart

A2

In a repeat of the previous race, Hirosaka jumped out to an early lead, but Pavidis spun at the start, and Steenari went by into second. Hohwart found himself in third, but soon after, he got on his lid and let Mitcham have third place. Pavidis worked his way up to fourth, and the battle for third was shaping up between Mitcham, Pavidis and Lieino. Lieino went for a pass on Pavidis and rolled it after the tabletop, entering the small straightaway. This gave Pavidis some room, and then he curbed it right at the end of the straight and allowed a few to get by. With 2 minutes left, Hirosaka was gone and looked confident that he would take the title back to Japan with him.

Steenari was also unchallenged in second place. Hohwart worked his way back up to fourth while Pavidis sat in fifth. He and Easton tangled, and this gave Hohwart time to work on Mitcham. He closed in on Mitcham, and he spun, and this allowed Hohwart to take third. With his second victory, Hirosaka won the 4WD championship, and the pressure was off for the third and final main!

1. Masami Hirosaka
2. Jukka Steenari
3. Rick Hohwart
4. William Mitcham
5. Teemu Lieino
6. Craig Drescher
7. Mark Pavidis
8. Billy Easton
9. Greg Hodapp
10. Matt Francis

A3

With the title already clinched, Hirosaka didn't have the pressure on him to go out and win. At the buzzer, he jumped out first, but there was a huge pileup after the triples. Easton took over the lead, followed by Lieino; Hirosaka found himself at the back of the pack. Easton and Lieino were way out in front, and then, going over the triples, Easton hit the inside of the turn and spun out while Lieino went past for first. At this point, Easton was second, Mitcham was third and Drescher was fourth, followed by Francis and Pavidis. Drescher got past Mitcham for third, he settled into fourth and Francis held on to fifth. Easton managed to close in a bit (less than 1 second behind), but then he got messed up in the rhythm section and let Lieino breathe a bit. Lieino said, "Masami who?" and crossed the finish line first while Easton comfortably cruised to second and Drescher finished third.

1. Teemu Lieino
2. Billy Easton
3. Craig Drescher
4. William Mitcham
5. Matt Francis
6. Greg Hodapp
7. Masami Hirosaka
8. Rick Hohwart
9. Mark Pavidis
10. Jukka Steenari

Top laps! So who was the fastest of the fast when it came down to race time? Let's take a look at the top 20 laps

	Race	Lap	Driver	Time
1.	A-2	10	Masami Hirosaka	22.77
2.	A-2	10	Mark Pavidis	22.78
3.	A-1	11	Jukka Steenari	22.97
4.	A-1	9	Masami Hirosaka	23.08
5.	A-2	7	Billy Easton	23.10
6.	A-2	10	Greg Hodapp	23.11
7.	A-1	8	Mark Pavidis	23.12
8.	A-1	12	Masami Hirosaka	23.13
9.	B	7	Graham Alsop	23.15
10.	G	11	Johann Tormann	23.17
11.	B	12	Jimmy Jacobson	23.17
12.	A-1	7	Greg Hodapp	23.17
13.	D	9	Brent White	23.18
14.	A-2	11	Teemu Lieino	23.18
15.	A-2	8	Matt Francis	23.18
16.	A-2	11	Matt Francis	23.19
17.	A-1	13	Masami Hirosaka	23.20
18.	A-1	12	Rick Hohwart	23.21
19.	A-1	11	Mark Pavidis	23.25
20.	A-1	9	Billy Easton	23.25

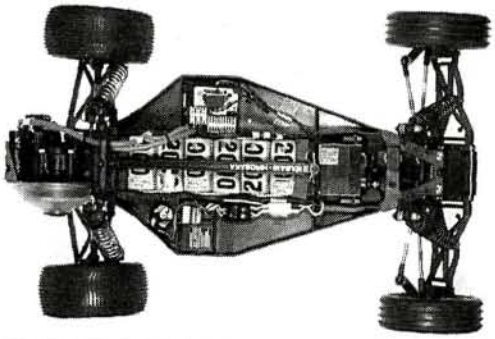
(Continued on page 124)

Winners

Fin.	Qual.	Driver	Nation	Chassis	Motor	Battery	ESC	Tires(F/R)
1	1	Masami Hirosaka	Japan	Yokomo MX-4	Reedy 10x2	Yokomo	Tekin M-Star Red	Losi Sprint/Losi Sprint
2	4	Jukka Steenari	Finland	Schumacher Cat 2000SE	Corally 11x3	Orion	LRP IPC V6	Losi Sprint/Losi Sprint
3	3	Teemu Lieino	Finland	Schumacher Cat 2000SE	Corally 11x3	Orion	LRP IPC V6	Losi Sprint/Losi Sprint
4	8	Craig Drescher	UK	Yokomo MX-4	Reedy 10x2	Reedy/Orion	LRP IPC V6	Losi Sprint/Losi Sprint
5	5	William Mitcham	UK	Tenth Tech. Predator XK-5	Maxtec 11x2	Maxtec	LRP IPC V6	Losi Sprint/Losi Sprint
6	7	Billy Easton	USA	Yokomo MX-4	Reedy 10x2	Reedy/Orion	LRP IPC V6	Losi Sprint/Losi Sprint
7	2	Mark Pavidis	USA	Yokomo MX-4	Reedy 10x2	Reedy/Orion	LRP IPC V6	Losi Sprint/Losi Sprint
8	10	Matt Francis	USA	Losi XX-4	Trinity 11x2	Trinity	LRP IPC V6	Losi X-2000/Losi X-2000
9	9	Rick Hohwart	USA	Losi XX-4	Peak 11x3	Peak	Novak Cyclone	Losi Blockhead/Losi Sprint
10	6	Greg Hodapp	USA	Losi XX-4	Trinity 11x3	Trinity	Novak Cyclone	Losi Sprint/Losi Sprint

1997 IFMAR OFF-ROAD WORLDS NEW IN THE PITS

An abundance of new products were floating around throughout the pits. Due to space limitations, we can't show you each and every item, so we tried to key in on some of the ones used during the race. Tune in to future issues, in which we'll bring you a sneak peek at a few of the other goodies we found at the Worlds.

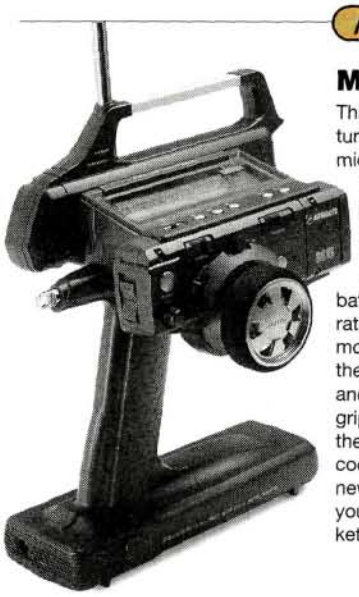


TEAM ASSOCIATED RC10B3

Uh, you did you know that Associated is releasing a revamped buggy, the B3, didn't you? It was in our November "Sneak Peek"! See what happens when you miss an issue? To recap, the B3 sports longer, equal-length A-arms on all corners, revised rear hubs, adjustable anti-squat, combination kingpin/ball studs up front along with 30-degree caster blocks and MIP CVDs right in the box. Oh yeah, it TQ'd.

MIP Aluminum CVDs

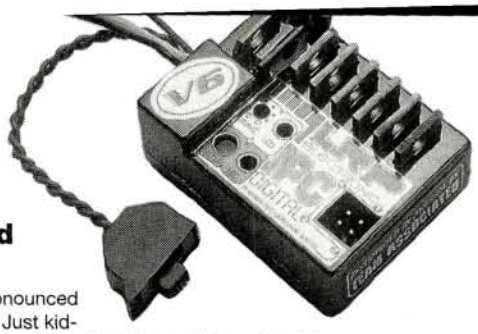
Sure, you've seen CVDs before. Heck, you probably have a set on your car right now. So what's new? These bad boys are all aluminum! Kinwald and Hirosaka both used these units to reduce rotating weight on the way to their respective 2WD and 4WD titles. Special coatings and carefully chosen alloys make the lightweight CVDs super-strong, and by the time you read this, they should be available for your off-road machine and popular sedans.



AIRTRONICS

M8

This new transmitter features 10-model memory, micro-narrowband FM receiver (see you later, glitches!), adjustable trim rate, throttle and steering expo, lap and elapsed timers, low-battery warning and dual-rate steering. A new, top-mounted display keeps all the features accessible, and a reversible-for-lefties grip keeps southpaws in the game. Here's a really cool, low-tech feature: new "Z" connectors allow you to jack into aftermarket receivers hassle-free!



LRP

IPC V6 Digital Speed Control

By the way, that's pronounced "lerp ipick veesicks." Just kidding. Team Associated outfitted their team drivers with this happenin' hunka hunka burnin' technology, and they weren't the only ones; over 60 percent of the attending drivers chose LRP speedos! The IPC V6's features include new 6.0 software for more mid-range power, extra-sensitive brake feel, extra start punch and built-in interference suppression. Of course, you still get LRP's single-button setup, digital current limiter, adjustable brake and more. Coolest feature? Gotta be the metallic blue case.

TEAM LOSI

Blockhead

Also new in the Losi tire department is the new four-wheel-drive Blockhead tread (hey, don't laugh; I helped coin the name at the race). The Blockhead was designed as a front tire to be used with the X-2000 or Sprint rear tires. Not much is known about this tire except that it will be available in Silver and Gold compound and, eventually, Red compound. What's that? Red compound? Oh yeah, baby! Team Losi will release an all-new super, super-sticky compound that works great on hard, slick tracks. You heard it here first!

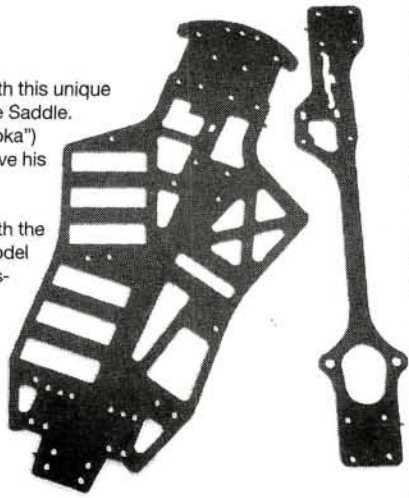
Kingpin/Ball Stud

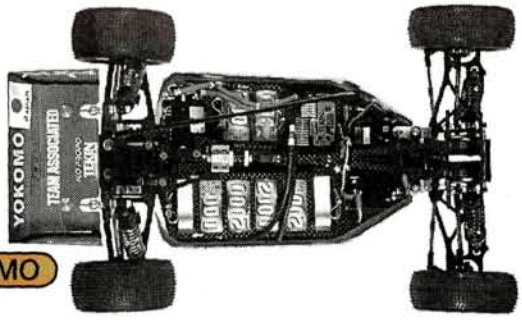
We spotted combination kingpin/ball studs on Kinwald's Double-X 2WD machine, as pirated from the Double-XT 'CR'. The new configuration reduces slop and friction by eliminating a pivot point, and it allows finer adjustment to camber link position via the placement of shims under the ball stud.

SCHUMACHER

Side Saddle Chassis

Team Schumacher experimented with this unique chassis layout, aptly named the Side Saddle. Team driver Jukka (pronounced "yooka") Steenari reported that the design gave his Cat 2000 better balance down the centerline and improved its jumping prowess. The chassis was tested with the stock top plate and the new Slim model pictured here. Team Schumacher discovered that the more flexible Slim plate made setup easier and gave the car more forgiving handling, while the stiffer stock unit delivered more aggressive steering, although the car was not as easy to set up. If Schumacher is as quick in getting these new chassis parts into production as they hope to be, they should be available before you even receive this issue!





TEAM YOKOMO

MX-4

Debuting at the Worlds was Yokomo's trick new 4WD, the MX-4. Masami Hirosaka put in some ultra-fast lap times with the car, TQ'd and won the car a championship its first time out. Although it had some "teething" problems and broke a few parts here and there, it should be noted that it was in its early prototype stage, and by the time it reaches production, it will have the Yokomo seal of approval. The skinny? It has a carbon fiber top and lower plate (the top plate has a small shock incorporated into its design to help with flexing), the diffs are lower in the chassis, and this particular prototype did not have a slipper clutch. Time will tell what the kit version will have. Apparently, this is Yokomo's answer to rough tracks, whereas its predecessors have generally been better suited to racing on smoother, indoor, groomed circuits. Expect to see more of this racer in the future.

PRO-LINE

Low-Profile Holeshot tires

Pro-Line's latest rubber was a hot choice for the Worlds' hard, blue-groove track. While the sticky M3 compound delivered glue-like traction, the blocky Holeshot tread pattern provided plenty of track-biting edges. Pro-Line's unique center-knob placement also gave the Holeshots plenty of forward bite, and the new, less flexible, low-profile carcass proved very responsive.

TEAM TRINITY

Armature Blank

Trinity tested an all-new armature blank that apparently had all their team drivers hyped up. It's a throwback to the Tri-Rotor days. It provides more rpm and overall power because it is lighter. According to Trinity's Rob Cutman, their D2s equipped with the new blank accelerated faster and showed a big power increase on the dyno.

Team Kinwald XX-4 Aluminum Motor Clamp

This trick, blue-anodized, aluminum motor clamp not only holds your motor securely in place, but it also helps dissipate heat. Do you own an XX-4? Check it out; it's pretty trick!

Team Kinwald Blue 4-40 Mini Locknuts

Trinity's new blue-anodized aluminum nuts can shave precious grams from your car, but c'mon, you just want 'em 'cause they're blue. Heck, they could weigh more, and I'd still buy a set.

The bbk Scoring System

(Continued from page 113)

schemes, including best time, best two times, total times, round points, race points (like the Reedy race format) and best lap times. Finals are created automatically and can be single- or three-leg, and the system scores the legs according to the many different ways done throughout the world. The system not only keeps track of ability, but it also compiles series points—again, with a number of options—and produces comprehensive meeting and driver statistics.

The system comes in a variety of forms—from the entry-level bbk club version designed for simple manual counting to the comprehensive Automated Race Control System with AMB Autocount support and series compilation to the DRIVERS system with DRIVERnet, seen at this year's Worlds at the Ranch. DRIVERS provides the ultimate in timing reliability and information distribution. Two independent computers monitor the AMB identification equipment for reliability, and during the race, corrections can be made, and penalties can be applied. Results are saved to disk at the end of each race (and during long races, so restarts are possible). During races, these computers send information out on DRIVERnet, a local area network, to DRIVERS workstations. There were six workstations at the Ranch—one for the announcer, one for the referees, two in the pits, one in the shop and one in the VIP lounge.

These workstations are independent PCs that can interpret and display this information in a number of ways. With his workstation, the announcer can view a race exactly as he wants to, without affecting the timekeepers' concentration. He sees the race in progress and can call up information about each driver, like car type, team, scale and actual speed and the all-important lap times. He also has a scrollable area that shows the results of the round so far with updates after each heat, so he can immediately see where particular drivers are headed, based on their current average lap times. The referees have their own screen display that shows race order (and grid prior to race start) in large numbers, so they can quickly see who is where (important with the IFMAR or staggered start and also if penalties have been incurred). Other display options show the race clock in large numbers and the results of the round so far. This is popular at the end of the round, as it is updated immediately and shows position long before the end-of-round print is posted. Printed race results are comprehensive; they not only show results and every lap time for every car, but they also include a table showing the position of each car during each lap of the race. Another table shows the top laps of the heat. The timekeepers are not ignored; they get a printout that identifies any particularly quick or slow laps that may indicate an AMB identification error.

Scoreboards can be attached to the system, and for the 1997 Worlds, Internet output was added. The program generated HTML files that contained results, so they only had to be copied to the Internet site, complete with all internal links. This is why the results were on the World Wide Web as quickly as they were posted on the wall—sometimes *more* quickly! Finally, the race organizers are not forgotten. They get facilities for printing transmitter labels, competitor labels, printouts showing how to sort the transmitter tech impound from heats to finals, automatic crystal reallocation and lots of useful functions that allow big races to run on time.

The folks at the Ranch Pit Shop were so pleased with the system that they have agreed to sell a fully featured U.S. version. It will be available toward the end of this year. In the meantime, you can buy a system based on the software that ran the Worlds now and get a free update when the full U.S. version is available. Prices range from $380 for bbk Club to $1,000 for a complete DRIVERS system. Network controllers for the U.S. will be available soon. Nelson has started to build a website that will contain up-to-the-minute product information and provide worldwide support. Point your browser to www.bbksoftware.demon.co.uk; email Sales@bbksoftware.demon.co.uk, or call the Ranch.

Finally, the question that seems to be asked most often: what does "bbk" stand for? Nelson is a fan of B.B. King, but that's not it. Check out the website, and you'll find the answer.

ROAR Off-Road Gas Nationals

by Kevin Hetmanski

FOR THE FIRST time, the ROAR U.S. Gas Off-Road Nationals were held on the East Coast—at Jr's Race Place, behind Doug's Hobby Shop in Waldorf, MD. The blue-groove track was big, challenging and well groomed. Racers from across America and Canada traveled to Waldorf for a shot at the U.S. gas championship title in 1/10-scale truck, 1/8-scale buggy and 1/8-scale truck. The weather that greeted them was hot, and so was the racing action!

Who rules the

1/10-scale truck TQ Mark Pavidis and his winning Associated RC10GT.

PHOTOS BY KEVIN HETMANSKI

roost in nitro?

1/8-scale buggy TQ Richard Saxton with his Mugen Seiki Super Athlete.

1/8-scale truck top qualifier Derek Furutani and his FTD truck.

ROAR OFF-ROAD GAS NATIONALS

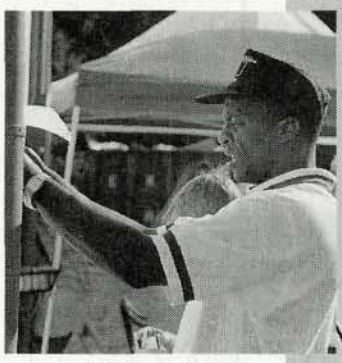
QUALIFYING

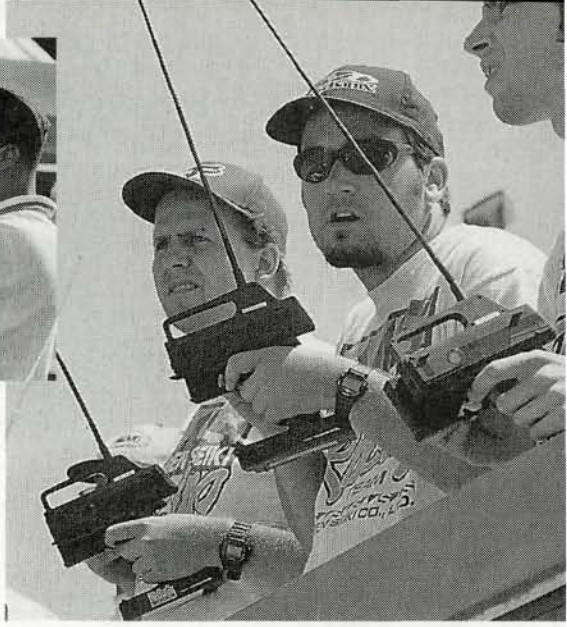
On Thursday, a controlled practice was held. Unlike the free-for-all practices typically held before races at club tracks, a controlled practice—complete with corner marshals—allows racers to practice in an organized fashion with competitors from their heats. The practice heats were run for five minutes each, which allowed the drivers to test and set up their cars under real racing conditions. There were four rounds of qualifying: two on Friday and two on Saturday. The two best qualifying rounds of the four determined starting position.

Mark Pavidis was the top qualifier in the 1/10-scale truck class. Jon Anderson qualified second, and Richard Saxton qualified third. In 1/8-scale buggy, Saxton drove aggressively to put himself in the top qualifying position, while Doug von Mosch qualified second and B.J. Christensen qualified third. In 1/8-scale truck, Derek Furutani easily sailed to the top qualifying position. Dave Henry took the number two spot and Greg Waller settled in as third qualifier.

A-MAINS

With the qualifiers in the record books, it was time for the best of the best: the A-Mains. Because of the small turnout, the 1/8-scale Truck Main lasted only 15 minutes. The 1/10-scale truck and the 1/8-scale A-Mains were an hour long—holy cramped trigger finger, Batman! The temperature was just over 100 degrees. Can you imagine being on the drivers' stand that long? Tip: hit the restroom before your race. The drivers who made both the 1/8-scale buggy and 1/10-scale Mains were up there for two hours! *(Continued on page 135)*





Above: this is James Radford, the man who organized this race so well! Right: Richard Saxton (center) was a man on a mission. Listen: you can almost hear the theme from "Rocky."

These had to be the hardest-working guys at the track! Regan LeBlanc (right)—pitman and mechanic for Richard Saxton—and Chester "P." (left)—pitman and mechanic for Mark Pavidis—were not only hard at work wrenching and tuning their own drivers' cars, but they were busy helping others with their problems, too!

Winners

1/8-SCALE TRUCK

Fin	Qual	Name	Chassis	Engine	Pipe	Fuel	Radio	Tires (F/R)
1	1	Derek Furutani	FTD	Rex	Rex	FSR 20%	Airtronics	Kyosho
2	2	Dave Henry	FTD	O.S. RX-B	Paris 650	O'Donnell 200%	Futaba 3PJ	Kyosho
3	3	Greg Waller	Kyosho MP-5	Omega	Omega 081	O'Donnell 20%	Airtronics 3PS	Kyosho
4	4	Brad Dewey	Kyosho MP-5	O.S. RX-B	O.S. T-2020	O'Donnell 10%	Futaba 3PJ	Kyosho
5	7	Brian Turner	Kyosho MP-5	O.S. 21 RG	O.S. T-2020	O'Donnell	Futaba	Kyosho
6	9	Samuel Kilby	Kyosho MP-5	Force 6-port	Own	Dynamite 20%	Futaba 3PDF	Kyosho
7	8	Scotty Maupin	Kyosho MP-5	Force	Own	Dynamite 20%	Futaba	Kyosho
8	6	David Leavitt	NA	NA	NA	NA	NA	NA
9	5	Edward Wong	Kyosho MP-5	Rex 3-port	Paris AL650	FSR 30%	KO Propo Precious	Kyosho

1/10-SCALE TRUCK

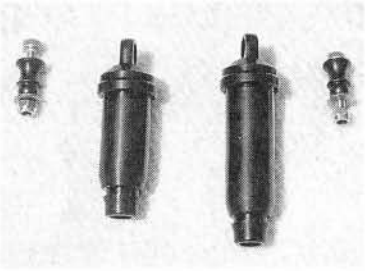
Fin	Qual	Name	Chassis	Engine	Pipe	Fuel	Radio	Tires (F/R)
1	1	Mark Pavidis	Associated GT	O.S. CZ-Z	Associated	O'Donnell 20%	Airtronics 3PS	Pro-Line Edge/Pro-Line Holeshot
2	3	Jon Anderson	Losi GTX	O'Donnell/OS CV	O'Donnell	O'Donnell 20%	Futaba 3PJ	Losi Directional/Pro-Line Holeshot
3	2	Richard Saxton	Associated	O.S. Max	Associated	O'Donnell 20%	Airtronics	Pro-Line
4	7	Ron Rosetti	Losi GTX	O'Donnell OS	O'Donnell	O'Donnell 20%	Futaba 3PJ	Losi Directional/Losi Sprint
5	6	Austin Dvorak	Associated GT	O.S. Max	Associated	O'Donnell 20%	Airtronics	Pro-Line
6	9	Bryan Winberry	Associated GT	O.S. Max	Associated	O'Donnell 20%	Airtronics	Pro-Line Edge/Pro-Line Holeshot
7	10	Paul Snyder	Associated GT	O.S. CZZ	Associated	O'Donnell 20%	JR Propo 756 PCM	Pro-Line M3
8	8	Todd Lewis	Losi GTX	O.S. CZ-Z	Losi	O'Donnell 20%	Airtronics 3PS	Losi Directional/Losi Sprint
9	5	Billy Easton	Associated GT	O.S. CZ-Z	Associated	O'Donnell 20%	Futaba 3PJ	Pro-Line Edge/Pro-Line Holeshot
10	4	Doug von Mosch	Associated GT	O.S. Max	Associated	O'Donnell 20%	Airtronics C3PS	Pro-Line Edge/Pro-Line Holeshot

1/8-SCALE BUGGY

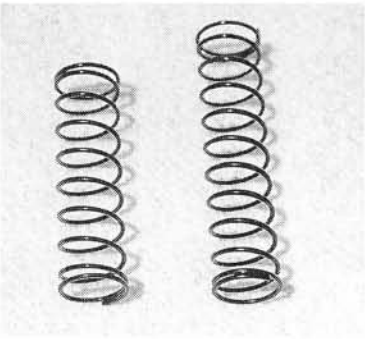
Fin	Qual	Name	Chassis	Engine	Pipe	Fuel	Radio	Tires (F/R)
1	2	Doug von Mosch	Mugen Super Athlete	Rex	Mugen	O'Donnell 30%	Airtronics 3PS	Pro-Line
2	5	Dave Henry	Kyosho MP-5	O.S. RZ-B	Paris 650	O'Donnell 20%	Futaba 3PJ	Kyosho "X"
3	8	Greg Waller	Kyosho MP-5	Omega	Omega 081	O'Donnell 20%	Airtronics 3PS	Medial Pro/Woops
4	6	Derek Furutani	Kyosho MP-5	Rex CX-21B	Rex 067	FSR 20%	Airtronics	Pro-Line
5	1	Richard Saxton	Mugen Super Athlete	Rex	Nova Rossi	O'Donnell 30%	Airtronics	Pro-Line
6	10	Brian Lavigne	Kyosho MP-5	O.S. RZ-B	Rex 067	O'Donnell 20%	KO Propo Precious	Kyosho X-Pattern
7	9	Chris Walrod	Kyosho MP-5	O.S. RZ-B	Paris	O'Donnell 20%	Airtronics	Kyosho
8	3	BJ Christensen	Mugen Super Athlete	Rex	Mugen	O'Donnell 20%	Airtronics 3PS	Medial Pro
9	7	Kris Moore	Kyoso MP-5	O.S. 21 RZ-B	Paris	O'Donnell	KO Propo	Kyosho X-Pattern
10	4	Mark Pavidis	Mugen Super Athlete	Rex 4-port	Nova Rossi/Mugen	O'Donnell 30%	Airtronics	Pro-Line

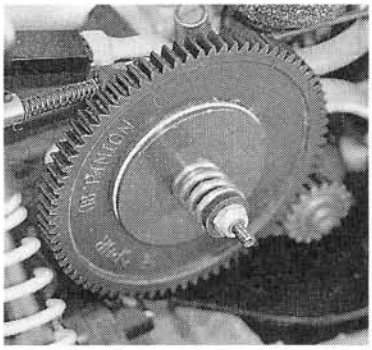
(Continued from page 130)

NEW in the PITS

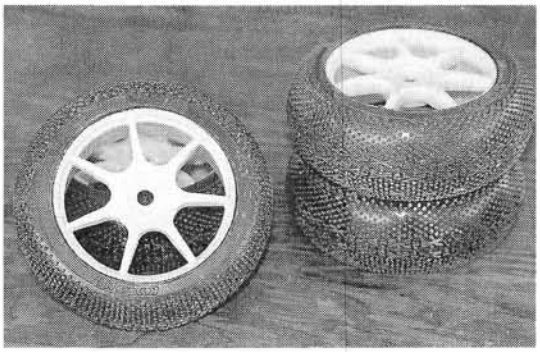


MIP had some new shock bodies for the Kyosho MP5, and springs for Kyosho and Mugen cars.

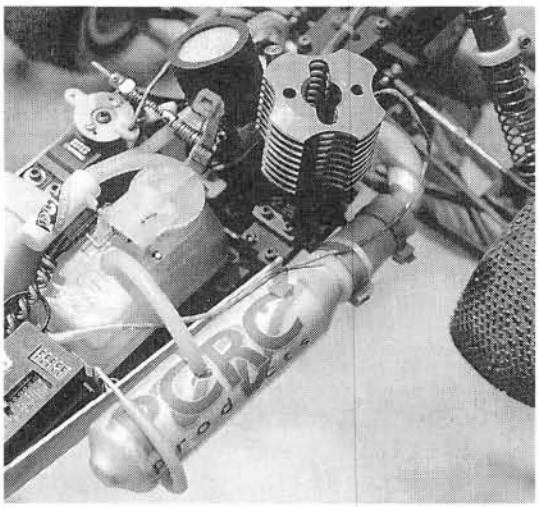




Losi tried out this double slipper setup on the GTX. It was pretty trick!

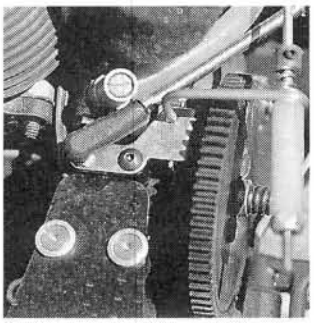


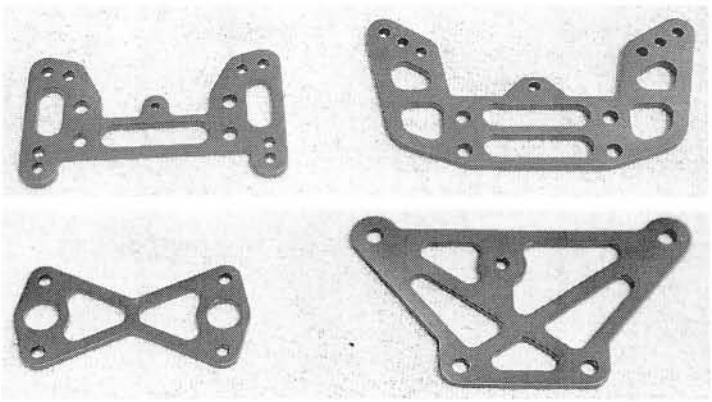
Kyosho was trying out a new set of tires. They seemed to hook up well on the blue-grooved surface.



PC/RC had a working prototype of their new electronic fuel regulator. This setup should be available by the time you read this.

Check out this prototype chassis brace for the RC10GT. Three braces work together to stiffen up the chassis tremendously. Word is that Lunsford will ultimately produce this kit.





FTD products had chassis braces and shock towers for the Kyosho MP-5 and the Mugen Super Athlete.

• **1/10-scale truck.** This was the most exciting race of the weekend. Mark Pavidis and Richard Saxton battled for first place for the first 15 minutes, until Saxton's RC10GT flamed out. Jon Anderson of Team Losi quickly moved up to knock on Pavidis' back door. These guys really put on a show; the lead seemed to change fifty billion times! Toward the end of the race, one of Pavidis' front hinge pins started to come out; disaster was averted when Mark came into the pits for fuel, and his mechanic hammered the hinge pin back in. Mark's RC10GT made it back onto the track in time for him to prevail over the rest of the field and win with 117 laps in 60:24.09. Jon Anderson and his GTX finished second with 117 laps and a time of 60:33.66, and Richard Saxton put his machine into third with 113 laps, 60:24.46.

• **1/8-scale buggy.** Another first-place battle occurred when Pavidis jumped out to an early lead, with Saxton not too far behind. Their Super Athletes shared a few lead changes until about the three-quarters mark, when Pavidis blew a rear drive shaft; that put him out of the running for first place. Then Saxton, the number-one qualifier, broke a servo horn. After it was fixed, he tried to charge back to the front of the pack but there just wasn't enough time. Doug von Mosch took advantage of their difficulties and strolled to victory with 119 laps at 60:08.35. Dave Henry and his Kyosho MP-5 finished second with 116 laps at 60:25.39, and Greg Waller—who also piloted Kyosho's finest—finished third with 115 laps at 60:06.46.

• **1/8-scale truck.** There is not much to talk about here! Derek Furutani dominated this class with his FTD truck. His smooth driving and fast laps put him in the winners' circle. He finished with 28 laps at 15:02.08, followed closely by Henry's FTD with 28 laps at 15:14.81. Waller's converted MP-5 finished third with 27 laps at 15:03.45.

FINAL THOUGHTS

Many thanks to everyone at Jr's Race Place and Doug's Hobby Shop for hosting this event. James Radford did an outstanding job of organizing and running this race—I think it's safe to say that everyone had a wonderful time. If you ever have the chance to see or compete in an event like this, I highly recommend that you do so! ■

A Racer's Complete Guide to Brushes

by Peter Vieira

Brush up on your motor know-how

THINK ABOUT IT: what makes your car go? The motor? If you want to get really specific, it's the armature. What spins the armature? The brushes and the current that flows through them to the commutator (comm). The more efficiently the brushes can get the juice into the comm, the faster you're going to go. The conditions that maximize the transfer of electrical energy—such as using strong brush springs to push the brushes hard against the comm—can also cause large losses of mechanical energy.

Now you begin to see why brush-tuning is such a subtle art.

Fear not! After you've perused our brush-tuning guide, you'll have everything you need to know about brushes and springs (you might want to get some plastic lamination sheets for this article; it's a pit-box keeper!).

BRUSH PARTS

A BRUSH FACE. The part of the brush that contacts the commutator.

B SHUNT. The braided wire lead that attaches the brush to the motor. Most brushes have a single shunt; some have two to allow a greater current flow and create a slight "heat-sink" effect.

C EYELET. The part that allows the lead to be fastened to the motor with a screw; racers often solder their leads instead. Brushes come with and without eyelets.

PHOTOS BY WALTER SIDAS

BRUSH FEATURES

• **Compound.** Brushes are made of copper followed by various degrees of graphite and/or silver. Copper is the primary ingredient because it is cheap, conductive and wears well. Graphite is usually added for its lubricating properties; less friction means greater rpm. Silver is generally added to increase conductivity, although silver also tends to harden the brush and increase comm wear.

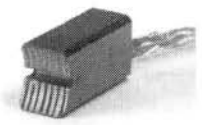
• **Standup or laydown?** At one time, all motors had their brushes in the "standup" configuration with the brush standing on its narrowest side. Many motors now use laydown brushes that place the brush on its widest side. Since both types of brush are the same size, they both present the same surface area to the comm—sort of. Because the laydown brush presents a wider face to the comm's curved surface, the brush can wrap farther around it. This makes a greater contact patch with the comm and increases conductivity; friction, however, is also increased (ain't it always the way?). Note: Associated's* "large" commutator motors have the same amount of brush contact whether the brush is in stand-up or laydown position.

BRUSH CUT

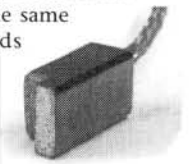
Most brushes have smooth, rounded faces to match the shape of the comm. Some also feature slots, holes, serrations, or other patterns cut into the face. These increase rpm, decrease break-in time, or provide other benefits. These are the basic cuts most manufacturers offer:

■ **Full.** A full brush is uncut; its face is smooth and rounded to wrap around the comm.

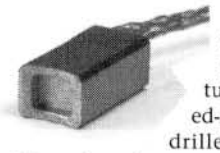
■ **Serrated.** Fine "ribs" in the brush face wear quickly, allowing the brush to break in faster. Once the serrations have worn off, the brush wears at the normal rate. Serrations may be combined with other cuts.



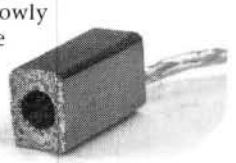
■ **Slotted.** Slotted brushes may feature very narrow or wide slots. The slot may cross the brush from side to side (horizontal slot) or from top to bottom (vertical slot). Slots provide cooling by allowing air to circulate through the brush. In some cases the slot can be used to hold extra comm fluid in much the same way as a pen nib holds ink.



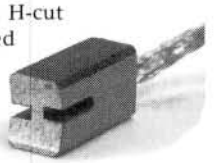
■ **Timed.** Timed brushes have a face that is essentially cut in half. When timed brushes are loaded into the motor, they simulate an advanced-timing setting without your moving the endbell. This type of brush is, therefore, a logical choice for stock-motor racing where the highest rpm are required, yet timing is fixed.



■ **Cavity or hollow.** Some brushes feature a shallow, molded-in recess or a deeper drilled hole in the face. These brushes were designed to hold more comm fluid against the comm. Some racers pack the deep-cavity brushes with cotton to slowly distribute the comm fluid as the motor runs. In addition, some believe that relieving the center portion of the brush gives it more "edges" to contact the comm.



■ **H-cut.** This makes the brush face resemble an "H." An H-cut is a vertically slotted brush, but the slot is interrupted in the middle of the face. This allows some of the cooling effect of a full slot but also gives a greater contact area with the comm.



TUNING WITH SPRINGS

Springs are available in several weights, or strengths; a "heavy" spring will press a brush more firmly against the comm than a "light" spring. Racers often choose a heavy spring to increase a motor's low-end torque. This, however, can cause the brushes and comm to wear more rapidly. In addition, the increased friction reduces maximum rpm and generates extra heat, especially if racers crank up the gearing to compensate for the loss of rpm.

Light springs are easier on brushes and permit the highest possible rpm, but they also have their own drawbacks; with less force holding the brush against the comm, the brush may "bounce" over the comm's poles and cause arcing and create pitting of the comm. This leads to more bouncing and a vicious circle of more arcing and pitting until the comm is severely damaged. Heat will also alter the strength of a spring—and we all know motors get hot. Once you have the correct setup figured out for your motor springs, be sure to note the type of spring you used so that you'll be able to replace them when they weaken.

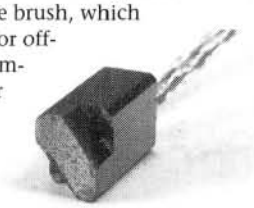
BREAKING IN YOUR BRUSHES

For maximum performance, the face of the brush must contact the comm fully. Although brushes come with a rounded face to roughly match the comm, it takes some run time for the brushes' shape to wear to match the diameter of the comm. The most common break-in method is to run the motor off a 4-cell battery, with no load, for five minutes or until the brushes have been fully worn in. Today, most racers simply install serrated-face brushes that break in almost instantly as the fine ridges wear away and leave the properly curved face.

DRIPS AND DROPS

Racers drip special fluids, generically referred to as comm drops, onto their comms to increase the conductivity and reduce friction. Some racers brew their own; others opt for the factory blends. Comm drops can give your motor a little extra boost, but the effects don't last long. If over-used, comm drops can even cause reduced performance. One dab'll do ya!

Bud's Racing Products (BRP*) offers a full line of brushes. Their signature brush is the no. 7154 Diamond Cut shown here. BRP claims this cut delivers maximum contact with the comm and minimum drag. Also unique to BRP is their no. 7157 3-side brush, which they recommend as the ideal brush for off-road. HPS (high percentage silver) compound brushes have 15 percent silver for maximum power. For slightly longer comm life, BRP suggests their Da Brush II compound.



Add "L" to part numbers for laydown versions.

Diamond cut **7154**
Large brush contact area with less surface drag.

Diamond cut **7167**
Da Brush II compound.

HPS full cut **7155**
Maximum power and torque.

HPS full cut **7165**
Da Brush II compound.

HPS hollow **7156**
Better contact with commutator for greater efficiency.

HPS hollow **7166**
Da Brush II compound.

Three side **7157**
Excellent off-road brush.

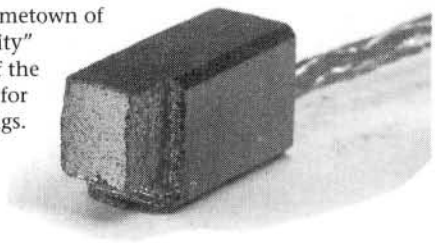
HPS timed **7158**
Artificially advances timing of stock motors.

HPS slotted **7159**
Slot helps cool brush to maximize power and efficiency.

Comm Drops
Komm Kool **7475**

Calandra Racing Concepts (CRC*)

has been involved in the model car biz for over 35 years, so it comes as no surprise that they've developed a few trick brushes. Time isn't the only thing on their side; CRC's hometown of Rome, NY, is known as "Copper City" because of its prodigious output of the copper ore, which is so important for electric-motor brushes and windings. CRC offers four compounds in their brush line: soft, for torque and long comm life; hard, with graphite for greater efficiency; silver, for high power and moderate comm wear; and super silver, for maximum power output.



Hard Pro-Flow II 6006
Vented design to run clean and cool.

Silver Pro-Flow II Silver.....6008
More power with moderate comm wear.

Super silver raked face (serrated).....6019
Top rpm and power.

Silver laydown hollow.....6038
Increased punch and efficiency.

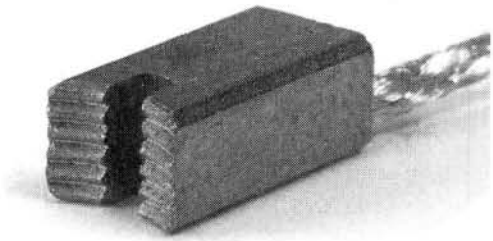
Hard H-cut laydown.....6046
Increased power and rpm, better cooling.

Silver H-cut laydown.....6048
Reduced comm wear over hard version.

Comm Drops
Speed Juice.....5004

Fantom*

have plenty of experience in making fast electric motors; in 17 years of racing, they have earned numerous world championship victories in the slot-car arena. Fantom's R/C motors are no slouches either, and their brushes are the same ones used in their Team Edition stock motors and hand-wound modifieds. For serious horsepower, use Fantom's High Silver brush. Pow!



Slotted stock silver serrated.....F-309
Cooling slot with high-power silver compound.

Silver hard serrated.....F-312
1/10 mod-motor racing brush.

Stock silver serrated.....F-315
Quick break-in, good power in stock motors.

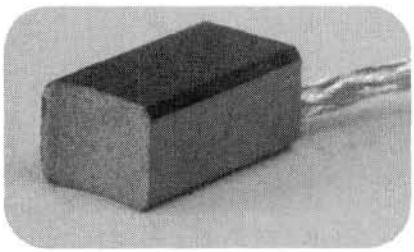
Silver full standup.....F-317
1/12-scale modified racing brush.

High silver.....F-319
Serious competition 1/10 mod oval.

Non-silver hard serrated.....F-320
Better comm life in mod motors.

Motor Man*

—the exclusive motor brand of Hobby Warehouse of Sacramento—keeps it simple and offers just four brush types for applications from sport play to modified racing. These brushes are great as-is, or they can be used as the starting point for your own custom cuts. Standup and laydown configurations are available.



Full face stock motor.....MM1200
For use in all sport stock motors.

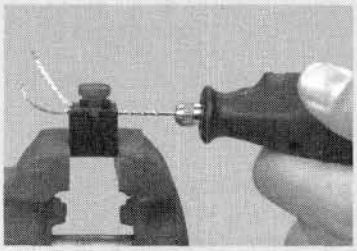
Stock racing.....MM1202
Soft silver compound delivers maximum power in stock-racing motors.

Laydown stock racing.....MM1211
Laydown version of MM1202.

Modified laydown.....MM1213
Hard silver compound for maximum power and minimum comm wear.

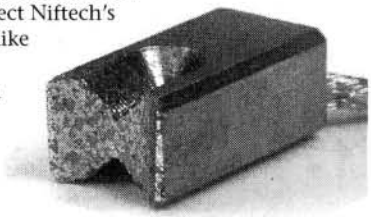
You Cut 'em

With specialized tools from RACEtech* and Niftech*, you can create your own custom brushes. Simply bolt the RACEtech tool to any ole stock motor and use it to create all sorts of timed and contoured cuts, or use it to break in your brushes; the cutting bit has the same diameter as a stock motor comm. The Niftech drilling jig holds brushes tightly when you drill vent holes and cavities and comes with drill bits. The jig is also handy when you slot or hand-file brushes.



Niftech*

takes brush technology to the extreme! With Niftech's no. 3030 Precision Commutator Gauge and a set of calipers, you can measure your comm diameter. Once you know the comm diameter, you can select Niftech's pre-cut brushes to match it. It's like installing perfectly broken-in brushes! Pre-cuts are available in several face types, including Niftech's exclusive X-cut.



Add "L" to part number for laydown brushes, "S" for standup. For eyelet-equipped brush, add "E." Pre-cut brushes also labeled with comm diameter. Add "L" for laydown, "S" for standup; "E" indicates eyelet-equipped.

Serrated laydown.....4301
Fast break-in; maximum power.

X-cut.....4302
Less drag; runs cooler; higher rpm; greater efficiency.

Slotted.....4305
.020 slot reduces drag, helps cool brush; delivers greater power and rpm.

Pre-arced slotted.....4306
Custom machined by Niftech to match comm; measure with Niftech comm gauge no. 3030.

Staggered slot.....4303
Offset slots prevent comm from developing high spot where slots line up.

Pre-arced staggered slot.....4304
Custom machined by Niftech to match comm.

Pre-arced Full.....4200SA
Custom machined by Niftech to match comm.

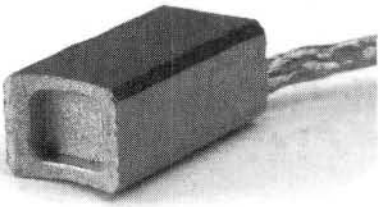
Standard serrated.....4300
High-performance compound; fast break-in.

Deep cavity.....4307
Central wearing; more power and better cooling.

Pre-arced deep cavity.....4308
Custom machined by Niftech to match comm.

Comm Drops
Hyper Drops.....4510

If you're a drag racer, you've probably heard of ***Power Surge****. They're two-time IEDA champs! Power Surge offers standup and laydown brushes in full and hollow cuts and in a variety of compounds. Their best brush is the no. 042 Medium Racing Compound standup brush, which Power Surge says is the hot setup for the big-volt, big-amp demands of drag racing.



Medium Racing Compound standup **042**
Drag racing.

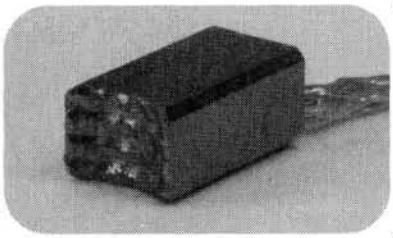
Hollow medium silver laydown or standup **043**
For oval/off-road stock motor use.

Silver laydown **044**
Maximum power for off-road, stock motor racing.

Silver serrated **045**
Use in all modified applications; instant break-in.

Comm drops
Nitro Drops (no part number needed)

RACEtech* offers a line of very useful tools and setup gauges in addition to matched batteries and racing motors. Rather than offer a wide variety of cuts, RACEtech encourages your creativity with their brush cutting tool, (see "You cut 'em" elsewhere in this article). One of the few cuts it won't duplicate is RACEtech's own waffle cut—their choice brush for stock-class racing.



Team Brush **3049**
Full, soft; excellent for stock motors.

Team Brush laydown **3050**
Laydown version of 3049.

Silver Team **3053**
Full face standup; top hp for modifieds.

Hard Brush **3055**
Most efficient for stock and mod motors.

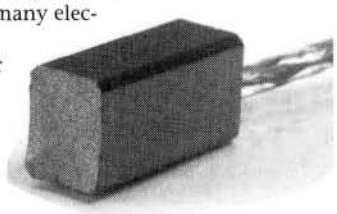
Laydown Hard **3056**
Laydown version of 3055.

Waffle Cut Hard laydown **3057**
High efficiency, torque and rpm in stock motor applications.

Pro Brush **3060**
Dual shunt for stock and mod speedway racing.

Pro laydown **3061**
Laydown version of 3060.

Does ***Trinity**** need any introduction? Involved with slot cars and R/C since approximately forever, Trinity has been the root of many electric motor innovations with their Epic series spinners. For spec and cost-controlled racing, Trinity's Street Spec brush is easy to tech; just look for the two-colored shunt. Keeps 'em honest!



Standup standard **4380**
Long wear with good conductivity.

Standup serrated **4383**
Instant break-in.

Laydown **4070**
Standard brush for laydown applications.

Laydown serrated **4087**
Quick break-in for laydown motors.

Laydown serrated slotted **4080**
Slot helps cool brush; good for on-road.

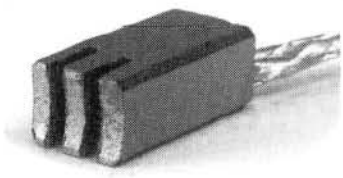
Timed laydown **4075**
Artificially advances timing in stock motors.

Timed laydown serrated **4085**
Quick break-in; advances timing.

Street Spec **SS-2229**
Smooth face with two-color shunt.

Comm Drops
Formula 96 ..... **TK2001**

As Associated's motor connection, ***Reedy**** has taken many trips to the winners' circle—from club races to World Champs. Put a little touch of Reedy magic in your motor with their high-quality brushes. Their Clipperbrush is actually adjustable; just clip off one of its "legs" and it's transformed from a 1/10 on-road brush to a 1/12 on-road brush.



Stand-up **730X**
Silver compound for on-road use; good brush and comm wear.

Stand-up **732X**
Low resistance, hard compound for on-road competition.

Stand-up Clipperbrush **733**
No. 732 brush with Clipper cut; use as is for 1/10 on-road, clip off a "leg" for 1/12-scale on-road.

Stand-up **737X**
Soft brush is easy on comm; good wear resistance; excellent for off-road.

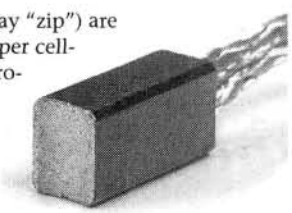
Laydown **760X**
Same as 737X; meant for large-comm motors.

Laydown **762X**
Same as 730X; meant for large-comm motors.

Laydown serrated **767**
Hard compound for low wear; high torque in stock motors.

V-cut laydown serrated **768**
Same as 767, but with vertical slot for reduced torque and greater rpm.

Although the folks at ***Xipp**** (say "zip") are perhaps best known for their Zapper cell-enhancement device, they also produce winning stock- and hand-wound modified motors. Xipp's motors feature Heavy Metal brushes with their own proprietary compounds and a high metal content to deliver low friction and high conductivity. Xipp call these their "horsepower kings" for stock and mod racing! Xipp recommend eyelet brushes for high-heat applications such as 4WD off-road and sedan.



Add "E" to part number for eyelet-equipped brushes.

Full-face standup **53003**
Copper/carbon; ideal for all mod applications; easy on commutator.

Full-face standup **53004**
Copper/carbon/silver; competition use only, high power mod use; double shunted.

Full-face laydown **53005**
Copper/carbon; good for most stock and mod applications; gentle to comm.

Full face laydown **53006**
Copper/carbon/silver; competition-only stock motor brush for high torque; double shunted.

Serrated standup **53009**
Copper/carbon; ideal for all mod applications, easy on commutator.

Silver standup serrated **53012**
Perfect for mod oval; easy on the comm; double shunted.

Silver laydown serrated **53016**
Copper/carbon/silver; high rpm for stock-motor competition; double shunted.

Standup cavity **53017**
Copper/carbon/silver; high power; low wear; ideal for machine-wound mods.

Laydown cavity **53018**
Copper/carbon/silver; excellent for stock-motor competition; double shunted.

Comm Drops
Big Brew drops **60006**

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

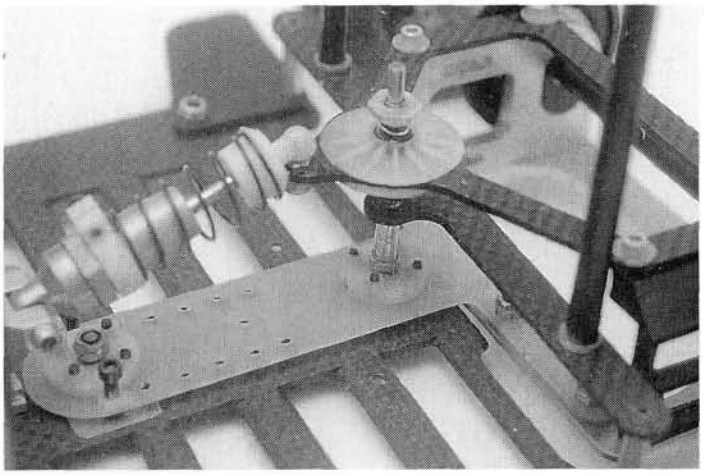
HOW TO

Understand T-Plates

Make your car's handling suit you to a "T"!

by Doug Mertes

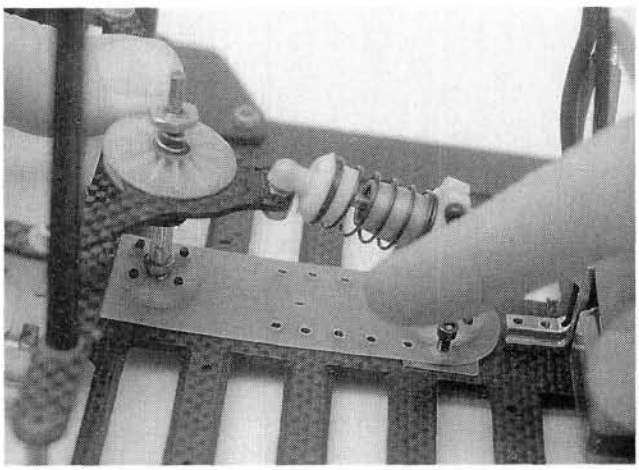
IF YOU WANT TO GO fast in R/C, one type of vehicle puts the power to the ground with efficiency that's unmatched by any fully suspended machine: the pan car. By omitting the heft of coil-over shocks, hinge pins, camber links, etc., pan cars achieve a high power-to-weight ratio that makes for some ballistic racing action. Pan cars still need suspension, however, to cope with bumps (albeit small ones) in the track surface. The familiar coil springs used for the front hubs are easy to understand, but a pan car's rear suspension is less transparent in its operation. Although the pan-car solution to the rear-suspension dilemma is simple in design, understanding how it works can be confusing—at least to the uninitiated. Read on, and you'll soon attain guru status!



Left: this is a typical pan-car design, using a T-bar. See how the rear pod rides on the tongue of the bar? Below: when the pod moves from front to back, the long part of the bar flexes.

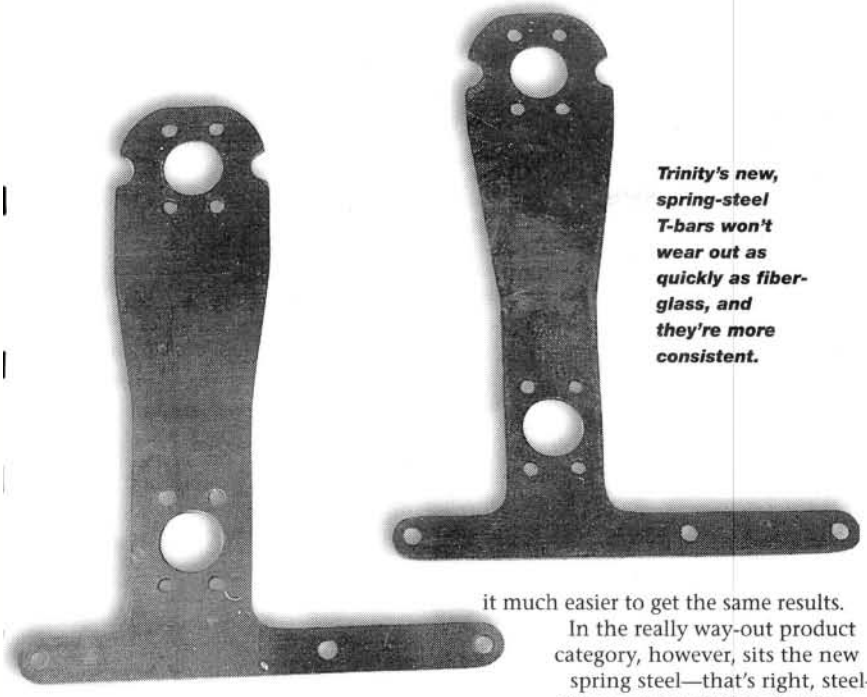
BELLY UP TO THE BAR

Many pan cars rely on a T-bar or T-plate (so named because of its "T" shape) to suspend the rear wheels. It's a robust, tunable design that has been around for a decade or so, and for one good reason: it works. The T-plate is typically attached to the main chassis by two rocker balls captured by molded plastic sockets, or "keepers." The T-bar flexes along its length between the two pivot points, thus providing a measure of suspension action for the rear tires. This action is usually damped by a shock absorber or a spring-loaded shaft. Manufacturers use various methods to damp the movement of the motor pod as it rocks left and right. For example, Associated* pan cars use the friction of two flat washers pressed by springs against the upper pod plate for roll damping; Trinity cars feature one or two oil dampers that splay out on either side of the upper plate to control roll. Other cars feature a tube within a tube that's filled with thick silicone fluid and attached to both the upper plate and the main chassis to provide hydraulic-like damping to the rear pod. The difficulty with T-bar tuning is balancing out the variables of T-bar flexibility, tire compound, shock-oil viscosity, spring pressure and surface traction. Believe me, the folks who figure out how to make these cars go fast really put a lot of brain-power into their work!



PHOTOS BY DOUG MERTES

Although pod movement damping options are many and varied, few tuning choices are available for the T-bar itself. At best, some manufacturers offer the racer a choice of T-bars with different thicknesses, although Trinity* also offer them in different lengths for their 1/12-scale cars. A thin T-bar results in more mechanical traction on slippery track surfaces; conversely, a thick bar is used when the surface has a high traction



Trinity's new, spring-steel T-bars won't wear out as quickly as fiber-glass, and they're more consistent.

coefficient. Are there any additional options? Start by looking at the flex-plate arrangement on your own car. Wiggle the rear pod left to right and really pay attention to how the flex plate reacts. See how it flexes along the long, narrow tongue? Move the rear pod up and down, and you can see how the bar actually bends in an area midway between the pivots. Some designs, such as the newer Associated 10L2 and 12LC, also concentrate some of the flex along the shorter end portion of the bar, but most T-bars flex between the pivots. Change the flexibility of those areas, and you alter the amount of available traction.

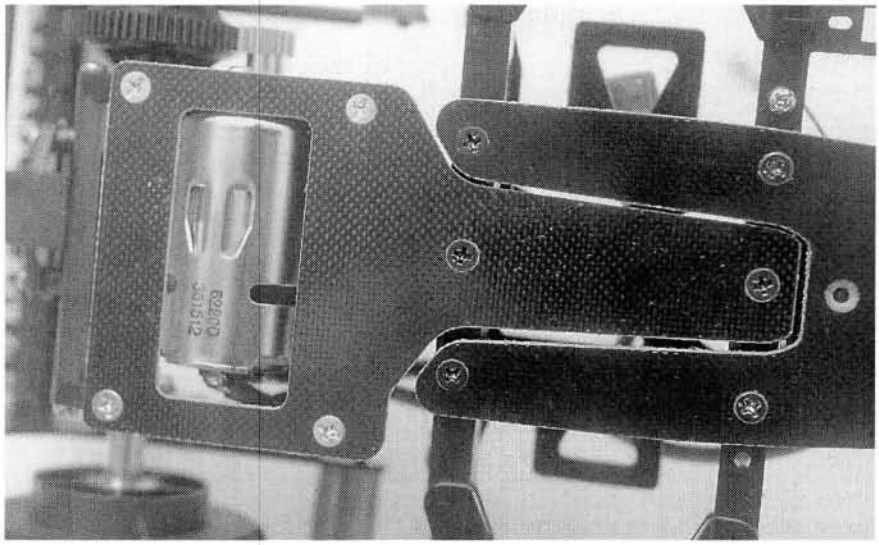
OPTION TIME

Some aftermarket manufacturers recently introduced a couple of products that can really make a difference to the way your pan car handles. Composite Craft released a new series of flex plates for popular cars that have sections of fiberglass removed from the center of the tongue (check with your local hobby shop for availability). This allows the plate to flex more easily, because it is mass (width times thickness) that controls flex in a fiberglass T-bar. Remove mass, and the whole kajammer gets a lot more flexible. It's simple, elegant, and it really works. Way back when, serious racers used to carve all sorts of shapes—rectangles, squares, triangles; you name it—out of their T-bars to come up with a super-secret design that would deliver magic handling. It worked, but boy, what a pain! Composite Craft made it much easier to get the same results.

In the really way-out product category, however, sits the new spring steel—that's right, steel—T-bars sold by Trinity for the Associated 10LSS and Trinity pan cars. These metal bars, according to Trinity, have a much more consistent memory than any glass-reinforced product, will last longer, are more resistant to impact and don't have to be changed as often as a conventional flex plate. It seems that the ultra-fast racers were swapping out T-bars after every heat (!) because they felt the fiberglass bars were deteriorating as soon as they started to flex. Although Trinity has no plans at this time to manufacture metal bars for the 1/12-scale crowd, 1/10-scale racers will be snapping these up as soon as they hit the shelves. They come in two widths that yield different degrees of rear traction.

Formula 1 car designs have an unusual problem in that the rear pods must be very narrow to accommodate the wasp-waisted body designs made so popular by their full-scale counterparts. Tamiya responded by producing a T-bar/chassis combination that incorporates the flex-plate tongue into a U-shaped cutout in the main chassis. This allows the rear pod to be as wide as a motor can be, without sacrificing too much mechanical traction. Though that's fine for the carpet crowd, those F1 cars used to be quite a handful on the parking lot, because the flex plates were suspended from the cross-braces by a simple screw and O-ring. That changed last year when Tamiya introduced a T-bar that rides freely on metal balls captured in plastic keepers that are incorporated into their innovative battery box. Now, rear traction is limited only by the viscosity of the fluid used on the damper washers.

Pan cars are fascinating, precise and highly adjustable pieces of racing artwork. Sure, they can be frustrating to tune, but understanding T-bar design and the tuning options available can make all the difference between watching that train of fast cars speeding around the track and being a part of it!



Tamiya's design is a little different; the body is very narrow in the rear. Their new flex plate is mounted to metal balls that allow free movement and superior traction over the inconsistent action of the O-ring-supported flex plate shown here.

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

HOW TO

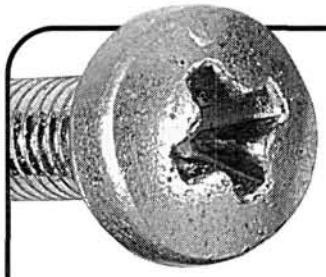
Nuts and Bolts of the Hobby

Car Action's guide to the hardware that holds your car together

by Peter Vieira

I KNOW what you're thinking. "Aw, c'mon—an article about hardware? What's next, an exposé on zip-ties?" Sure, it sounds like mundane stuff, but hardware is what keeps the whole R/C show on the road. Although most of us are wrenching every day, I'm constantly amazed by how little many hobbyists and even racers know about the critical parts of their cars; how different hardware functions; when a piece is appropriate; what fits where. Although this article will be especially helpful for newcomers, I bet even the most grizzled R/C veteran can learn something new.

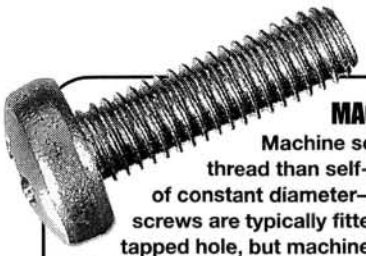
Most of us at least know the difference between a nut, screw and bolt, but the distinctions go far beyond that. Here's what's holding your car together:



PHILLIPS-HEAD

On foreign cars, the Phillips-head screw is more popular, as any Tamiya builder will agree. It's easy to find tools for the ubiquitous cross-pattern head, but sizes have to be considered when dealing with Phillips-head screws. The silver self-tapping screws that hold together most Tamiya kits accept a no. 2 Phillips screwdriver, while smaller screws may take a no. 1. Be wary of European kits with looks-like-Phillips-head screws; these are actually of a subtly different pattern that can give you trouble. The trouble isn't that a regular Phillips screwdriver doesn't fit, but rather that it fits poorly; instead of using the right tool, most of us forge ahead with the kit's construction and scar the fasteners. When the screws have been subjected to this abuse, the heads soon strip. No fun! The tool to use is a Posi-driver. High-quality Posi tools by Wiha are available from Schumacher*, as Schumacher uses Posi screws exclusively. Well-stocked hardware specialty stores may also have Posi tools.

PHOTOS BY WALTER SIDAS



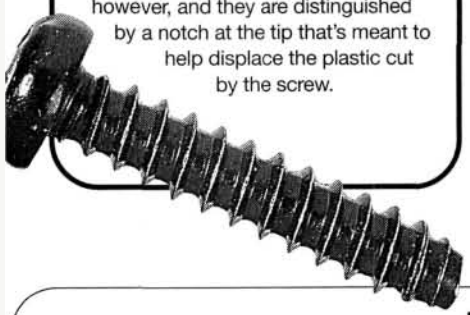
MACHINE SCREW

Machine screws feature a much finer thread than self-tapping screws and they are of constant diameter—no pointed tip. These screws are typically fitted into a corresponding nut or tapped hole, but machine screws may also be threaded into plastic. An accurately sized hole is required for this use, but the machine screw is less prone to loosening once it's in.

SCREWS

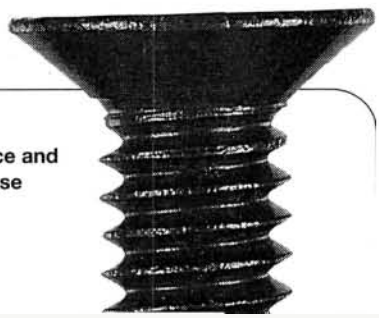
SELF-TAPPING SCREW

As the name implies, this screw will create its own thread as it is turned. The pointed tip centers the screw in the hole (self-tappers need a pilot hole or they'll split the piece in question), and the sharp, coarse threads dig in, pulling the screw into the part with each twist of the screwdriver. Self-tapping screws are generally reserved for use on soft plastics, which can deform to accept the screw. The screw doesn't cut a new thread so much as it presses a new thread into the plastic. Some self-tapping screws are designed to cut, however, and they are distinguished by a notch at the tip that's meant to help displace the plastic cut by the screw.



DETERMINING SIZE

Although most manuals include a hardware chart to match sizes, knowing how to measure a screw is a skill that will serve you often. Metric screws are easy: an M3x15 screw has a 3mm shaft diameter and is 15mm long. "American" or SAE screw sizes vary slightly in thread count, or number of threads per inch. Most SAE car hardware is 4-40, or 40 threads per inch. The "4" represents the diameter of the screw—bigger number, fatter screw. Washer size is determined by the inside diameter. In metrics, an M3 washer accepts a 3mm screw; in SAE, a no. 4 washer accepts a no. 4 screw, such as a 4-40.



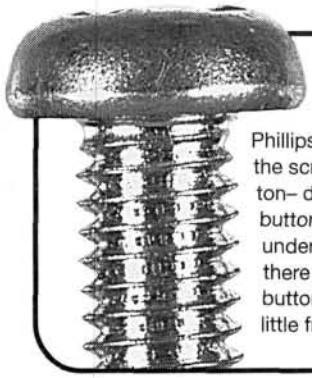
FLAT-HEAD

These screws are typically used on chassis undersides where they fit flush with the chassis surface and are impossible to snag on rough terrain, carpet, or pavement. Due to the sloping-head design, these screws present a large surface area to the part they are fastening for a good, tight joint.

ALLEN

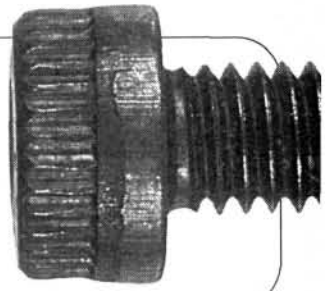
Most common among the U.S.-built R/C cars and trucks are hex-head or Allen fasteners. These feature the familiar six-sided socket design. Although they work exceptionally well with the proper size tool, the inexpensive wrenches supplied with most kits can also strip easily when used as your everyday tools. I highly recommend a set of RPM* wrench sets with precision-ground tips. The fit is ultra-precise, so when you turn, the screw turns—every time. Bolink*, Trinity*, Associated* and Wolfe Motorsports* also make very high-quality wrench sets.

BUTTON-HEAD



These are most commonly Phillips-head screws. Once installed, the screw's head sticks up like a button– duh! In the hex-head arena, slim, button-head screws are useful for under-chassis applications where there is no countersunk hole. The button-head design protrudes very little from the chassis' bottom.

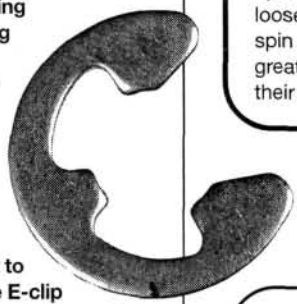
CAP-HEAD



This is the most common style of hex hardware. The deep socket gives the wrench plenty of meat to prevent it from slipping, but the head is scarcely larger in diameter than the screw shaft. In a high-stress application, a washer is often added under a capscrew to help spread the mechanical force of the screw and prevent parts from cracking or from being deformed.

E-CLIPS AND C-CLIPS

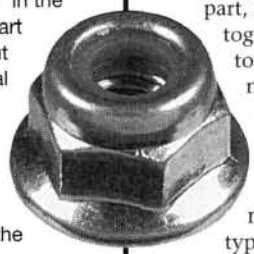
The "devils" of the R/C world, E-clips resemble an "e," albeit a goofy, rounded one. E-clips are fitted to a smooth shaft, such as a hinge pin or shock shaft, by means of a slot in the shaft. The springiness of the E-clip allows it to be snapped around the shaft, while the shaft's slot holds the E-clip perpendicular to it. E-clips are most often used to prevent the shaft to which they are fitted from sliding out of a hole; they don't really hold things together as much as they prevent them from coming apart. When installing E-clips, eye protection is a good idea—they can really fly if they jump off a shaft instead of snapping around it. If you're down to your last E-clip and can't afford to lose it to a fly-away, install the E-clip with a towel draped over the parts.



C-clips are like E-clips minus the little tongue in the middle, and they are also fitted to a slot in a shaft. A C-clip, however, will fit more closely to the shaft and will engage more of the shaft's slot. C-clips often appear in transmissions where gears may press against them; the C-clip is better at load-supporting duties than the "flexier" E-clip.

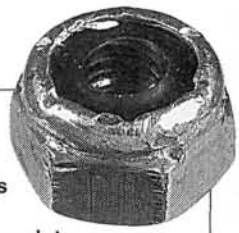
FLANGED LOCKNUT

This may be a nylon locking design with a load-spreading flange on the bottom, or a friction-type design. The friction type omits the nylon material and instead uses fine "teeth" in the nut's flange to dig into the part being fastened. Once the nut is tight, there is a mechanical fit between it and the part. Friction-locking flange nuts are usually used where the nut will press against a "soft" material, such as plastic or fiberglass. Unlike the nylon locking mechanism, once loosened, the friction design is easy to spin off a screw. All flanged nuts offer greater clamping strength because of their larger contact area.



NUTS

If a screw isn't threaded directly into the part, a nut is used to squeeze the joint together. Although thread sizes vary to match particular screws, all the nuts we use in R/C are the common six-flat type seen everywhere in the machine world. Differences between nuts relate to their mechanisms for looseness prevention. Here we show types we encounter in R/C.

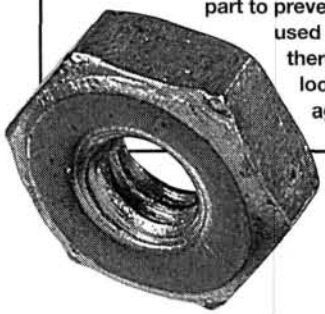


LOCKNUT

Locknuts have a soft nylon inset pressed into their top. As the nut is threaded onto a screw, the nylon grabs the screw threads tightly enough to provide resistance but still allow you to install the nut. Locknuts don't rely on tightness to stay in place; for instance, a locknut used to secure a shock to a shock tower may have to be backed off a turn or two to allow the shock body to move freely. While an ordinary nut would then be loose, the locknut will stay in place, no matter how rough the going.

JAM NUT

Also known as plain nuts or flat nuts, jam nuts do what their name implies: they jam against another threaded part to prevent it from turning. They are also used to squeeze parts together, but there is nothing to prevent them from loosening except their tightness against a given part.

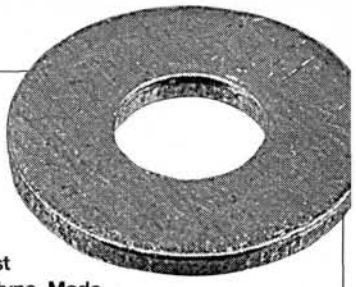


ALUMINUM HARDWARE

Aluminum hardware has become popular not only because it's light, but also because it can be anodized in a dazzling array of colors. Have fun lightening and dressing up your car with these little gems, but use caution. Aluminum is softer than steel, so it will strip more easily—tools of the proper size are a must. A pre-threaded hole is also helpful, as the soft aluminum does not cut a thread easily. Use a little soap on the screw to make threading it easier. If the screw seems to have a tough time going in, don't force it; you may snap off the head.

Avoid threading aluminum screws into aluminum parts. The parts will gall when tightened, making removal virtually impossible. If you must use a piece of aluminum hardware in an aluminum part, first coat the threads with grease, wax, or soap to avoid galling. You should also avoid using aluminum screws for high-stress jobs, such as securing bulkheads and shocks. Stick with steel, or your car might wind up purple, lightweight, and a DNF!

WASHERS



I can actually hear your eyes rolling. Read on; you'll learn something. Washers are used in three different applications: to spread the force of the screw over a wider area so the joined parts aren't over-stressed, to prevent the part's surface from being scarred by the screw head turning against it, and to prevent the fastener from loosening. In the last case, a locking washer is used—typically the "split" type. Made of spring steel, the washer resembles a single coil of a tiny spring and acts in virtually the same way. When a screw or nut is tightened against it, the washer's spring action pushes against the nut and applies a load to the threads that helps prevent loosening. These washers are not a substitute for a good locknut or thread-locking compound, but they are a good measure for extra security.

THREAD-LOCKING FLUID

A must for high-vibration applications such as nitro-powered vehicles, this magic potion is very much like cyanoacrylate (CA) glue in that it is an anaerobic cement: it hardens in the absence of air. When a screw coated with locking fluid is tightened, any air between the part and the screw is displaced, and that activates the locking fluid. In addition to its adhesive properties, the locking fluid fills any gaps between the part and the screw that might allow it to loosen. Which fluid to use? Much as we use the words "thermos," "kleenex" and "superglue" to refer to any vacuum flask, tissue or cyanoalcrylate glue, so "Loctite" has come to stand for all anaerobic locking fluids. Coded by color (although the container is always red), medium-strength blue Loctite is best for most R/C uses, and red may be applied for real shake-and-quake applications, such as nitro-engine mounts. It's a good idea to use thread-locking fluid whenever a screw is threaded into metal, whether the vehicle is electric or gas. If you need thread-lock on a plastic part, skip the anaerobic formulas; they may ruin the plastic. Use a dab of white glue, silicone, or kit-supplied safe-for-plastics thread-lock instead.

** Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

HOME PROJECT BUILT

1/24-SCALE SUPERTRUCK

by Kevin Meyer

IN THIS DAY AND AGE, technology dictates that everything be built smaller and smaller, and R/C technology is no exception. But for master modeler Terry Plummer, the wheels of progress just don't turn fast enough! Terry—who usually makes trends rather than follows them—is the man behind these precisely crafted "Micro SuperTRUCKS"; they are based on 1/24-scale static models. Terry is very scale conscious; to start a project, he finds or makes the body to scale, then he builds the chassis to fit the body.

The project actually started because Terry was trying to make a crossover connection between slot cars and R/C cars. There are some plans in the works for a special track that will wed the two hobbies, but Terry is keeping that idea under wraps for now! This model has very few parts, as simplicity is always Terry's goal. The front end features axles and steering blocks pilfered from Tamiya's* Tamtech line of 1/24-scale cars. The steering assembly is made of Du-Bro* 2-56 swivel ball sockets, and threaded rod tie rods are linked up to a Futaba* S132H microservo. Because of limited chassis space, the microservo is a must. The tires and rims are 1/24-scale slot-car parts.

Mini-truckin'

Itty-Bitty Bodies

The Lexan bodies for these little racers were produced from a static model kit. Terry used a 1/24-scale AMT kit for this particular project. The styrene body was filled with Bondo to make it a solid structure. As soon as the Bondo hardened, all the rough areas were sanded smooth. Next, a sheet of .030 Lexan was attached to a special framework and baked in an oven. When the Lexan reached the proper temperature, it was removed and vacuum-formed over the styrene model. When it's cool, the body can be trimmed, painted and detailed; with this method, Terry can reproduce almost any small-scale body that's available.

PHOTOS BY KEVIN MEYER

Specifications

Chassis
1/16-inch-thick G-10 fiberglass; upper plate, .020-inch fiberglass

Front suspension
Tamiya Tamtech steering blocks and axles

Rear suspension
.030-inch aluminum motor pod; 2-56 Du-Bro ball sockets/threaded rod; piano wire rollbar (swaybar)

Motor
Kyosho LeMans DMC20 with ball bearings

Batteries
6 cells, 120mAh

Gears
machined slot-car 64-pitch, 50-tooth spur and 10-tooth pinion

Tires/Wheels
Pro-Track 0.8 x 0.7-in. slot-car tires and wheels (tires were narrowed to 0.50)

Body
custom-formed, .030-thick poly-carbonate (reproduced from 1/24-scale AMT static model)

Electronics
Futaba Magnum Junior transmitter; Dynamite Shredder receiver; Futaba S132H microservo; DuraTrax Spike ESC

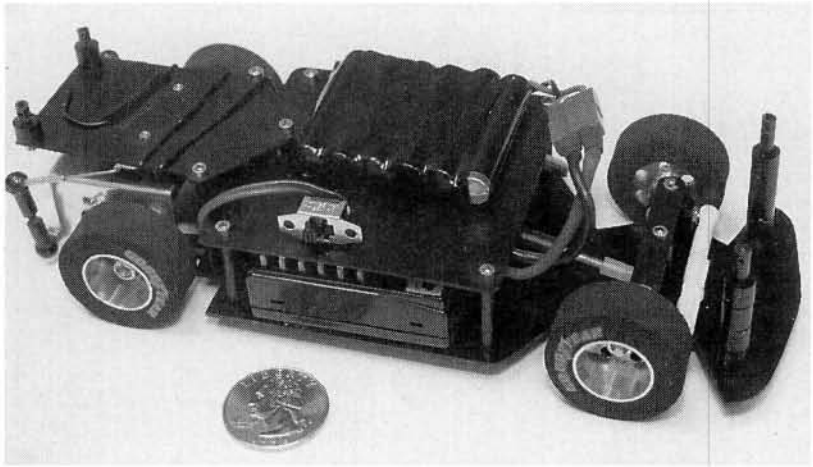
Dimensions

Wheelbase:	4.62 in.
Width:	3 in.
Length:	8 in.
Height:	2.62 in.
Weight:	8.9 oz., RTR

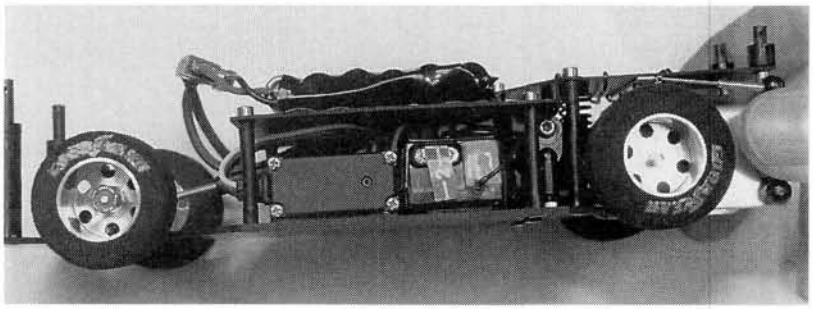
All my race gear fits perfectly into my briefcase. I could take the car to work and race against my buddies at breaks and lunchtime. Guess I'll have to ask the boss for an extended lunch hour so we can get in three heats and a Main!

madness!

HOMEBUILT 1/24-SCALE SUPERTRUCK



"Micro" is the word that comes to mind here. Twenty-five cents is about all you'll need to run and maintain this 1/24-scale racer.



A 1/16-inch-thick swaybar is used to stiffen the rear suspension. The bar is attached to the motor pod with 2-56 Du-Bro ball-end sockets and 2-56 threaded rod.

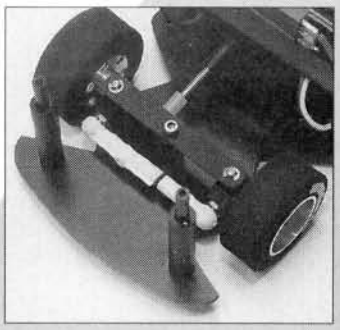
To accommodate the batteries, the chassis has an upper deck cut from .020-inch-thick fiberglass and a main chassis made of 1/16-scale fiberglass. To get that finished kit look, Terry boils the fiberglass in black dye in a pressure cooker to get the parts nice and dark. The radio gear is neatly arranged on the lower chassis plate. For obvious reasons, only the smallest electronics are used!

At the rear of the truck, three trailing arms connect the motor pod to the chassis. These are constructed of 2-56 ball ends and threaded rod. Tweak, steering and traction can be adjusted by lengthening or shortening the arms. The rear swaybar, made of piano wire, is secured with another combination of 2-56 ball ends and theaded rod. The motor pod itself is formed of .030-inch aluminum; it wraps around the Kyosho* DMC20 motor and acts as a heat sink. The remaining parts of the mini-truck's drive system were pirated from both R/C and slot cars. Terry machined a slot-car's spur gear so it would work smoothly with tiny 1/16-inch diff balls.

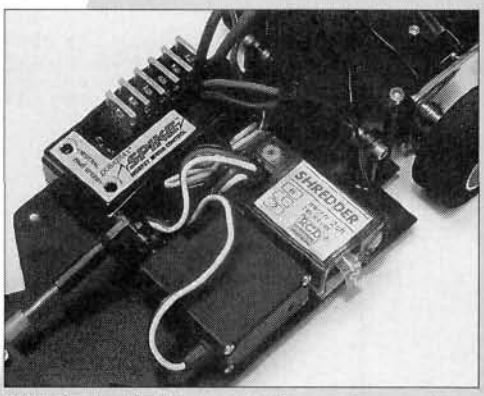
The body was cast from a 1/24-scale static model (see sidebar, "Itty-Bitty Bodies"). A sheet of .030 polycarbonate Lexan was used to form the body. After the molding process had been completed, the shell was shot with the "Raybestos" custom fade paint scheme using Pactra paints. The decal set was swiped from the 1/24-scale AMT static model kit. Terry—never one to skimp on details—constructed the roll bars from small plastic tubes and painted them to match the body.

This little racer is great fun to drive, and it really scoots! The micro size is amazing and allows the truck to be raced almost anywhere. Run time is about 8 minutes, and the truck is feather-light. Hey, can you imagine strapping a 2-speed tranny on this minuscule ride? I think we'd better contact NASA before we launch this one!

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

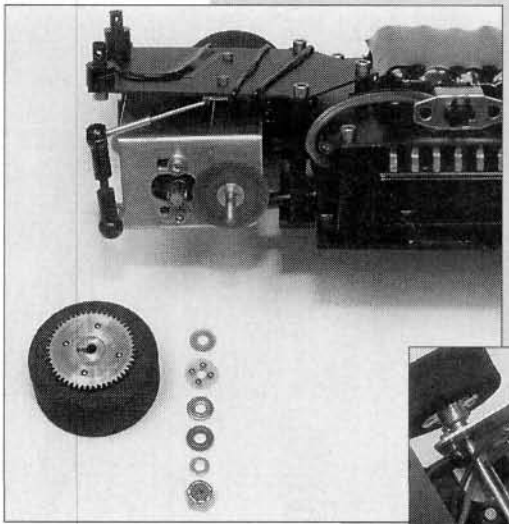


The front suspension uses Tamtech spindle blocks and axles. To make up the tie rods, 2-56 Du-Bro ball-end sockets and threaded rod were used.

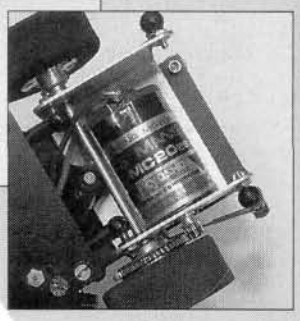


With the top deck removed, it's easy to see why the choice of electronics is crucial! Space is quite limited on the chassis. Terry's work is very neat and clean; this looks as if it could be a kit car.

A six-pack of 120mAh cells is neatly packaged and secured to the top deck with servo tape.



The diff uses miscellaneous hardware for the thrust assembly. The spur gear was machined to achieve a thickness that would ensure smooth diff action. Note the 1/16-inch balls in the spur gear.



The motor pod is constructed of .030-inch-thick aluminum and houses the Kyosho DMC20 powerplant. The axle is a 3/32-inch, threaded, slot-car part.

This is YOUR PAGE!

That's what "Grassroots" means—from the roots—the ground up; and that means YOU!—real, live R/C'in' readers—an entire page of your stuff! Show the world—yes, everywhere from here to there—what you and your R/C friends are doing. Wanna brag? Here's the spot. Go on; show us!

Send photos with captions to "Grassroots Racing," Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606.

call now!

Whether you're a dealer or just a bunch of fun-lovers in search of a race program, call now! Here are a few hotline numbers to call if you have any questions, or if you'd like to start a program in your area.

Bolink Legend Series
(404) 963-0252

Tamiya R/C Championship Series
(800) TAMIYA-A

Kyosho R/C Sport Racing
(800) 682-8948 ext. 085F

Hobby Shack Parking Lot
(714) 964-8846

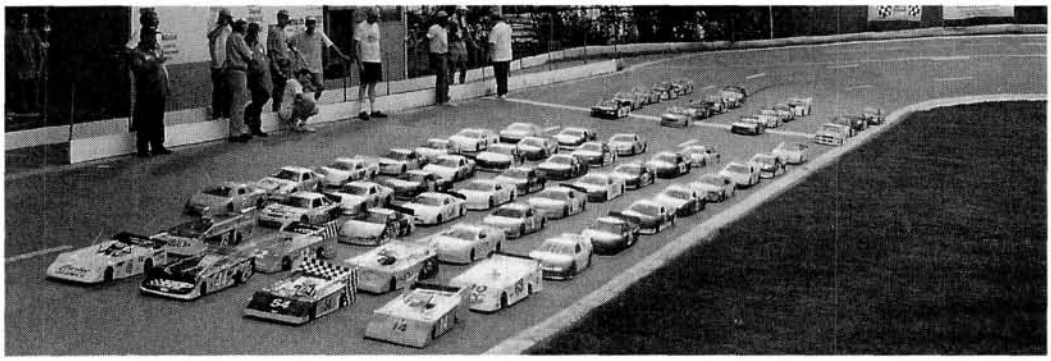
Hobby Town USA Parking Lot
(402) 434-5050

Trinity Street Spec Series
(908) 862-1705

WINNERS	LAPS	TIME
NASCAR		
1 Jim Likeric	60	4:28.93
2 Ron Shattuck	60	4:29.29
3 Sarah Streeter	55	4:29.17
SUPERTRUCK		
1 Gerry Suderlage	60	4:31.17
2 Jay Streeter	58	4:32.29
3 Shawn Becher	52	4:32.53

Southeastern Wisconsin NASCAR & Supertruck Series, Race 1

Racers gathered early this season at ABC R/C in Waukesha, WI, for the first race of the Southeastern Wisconsin NASCAR and Supertruck series. After running in 3- and 4-minute qualifiers and a 60-lap Main, drivers gathered with their cars to pose for this group shot. Back row (left to right): Jay Streeter, Gerry Suderlage, Shawn Becher, Sarah Streeter and Ehren Cultice; front row (left to right): Ron Shattuck, Shawn Kiely, Hays Reeling, Jim Likeric and Shane Heaney.



QSAC Nationals Take Machesney Park Raceway by Storm

Despite the threat of storms, 68 cars from 16 states and news teams from several TV and radio stations turned up for QSAC's third National Championship Series race: the Midwest Nationals held at Machesney Park Raceway in Machesney Park, IL. Machesney's great staff had all the bases covered for a successful event. They arranged ample pit/parking space, loads of practice time, great chow and an organizational system that kept things moving throughout the entire weekend, despite minor interruptions caused by rain and storms.

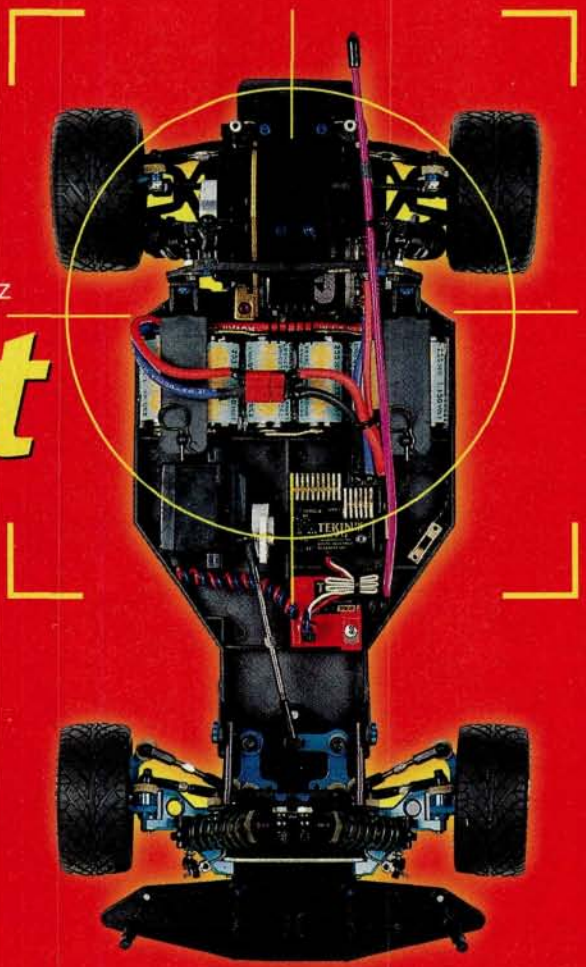
WINNERS	CHASSIS	TIRES	RADIO
Grand National			
1 Terry Rea	LTG	BRP	Futaba
2 Roger Newell	WCM	MRP	Futaba
3 Noel Templeton	LTG	BRP	Futaba
Sportsman Grand National			
1 Mike Moore	LTG	BRP	Futaba
2 Russell Daley	WCM	MRP	JR
3 Gene Blixt	WCM	MRP	Futaba
NASCAR Supertruck			
1 Bill Dagenhart	WCM	MRP	Airtronics
2 Mike Schmidt	WCM	MRP	Futaba
3 Jim Hock	WCM	MRP	Futaba

Before thunderstorms rolled in on Friday evening, competitors lined up their cars on the track for concours judging and photo ops. Concours winners included Clayton Younker's Outlaw Late Model, Brian Stanton's Grand National and Jeff Boelkes' NASCAR Supertruck.

Project

Associated Dual Sport

by George M. Gonzalez



THE INSPIRATION for this project came to me one day while I was cleaning out the R/C storage room at our office. The room had become so cluttered that it was almost impossible to move around. I was amazed at all the old stuff that we've accumulated over the years. One of the items really piqued my curiosity; it was an old mid-motor chassis conversion kit—offered through Tekin*—that was designed for the Associated* RC10 and RC10T off-road vehicles. It featured a unique "active-link" rear suspension that didn't really catch on at the time. The kit included a carbon-fiber composite chassis, an aluminum motor mount, a rear bulkhead and a molded tranny brace. Although this chassis is no longer available, I decided to pirate it and the motor mount and create a mid-motor Associated Dual Sport (DS-Mid). The journey begins.

DS! On the Tekin composite chassis, the motor is in front of the rear wheels (instead of behind them), and the battery pack is across the chassis (instead of inline). These two characteristics give the DS Mid plenty of turn-in steering.

MAKE MINE

INSTALLING THE CHASSIS

Assembling the chassis was incredibly easy. I removed the entire front suspension (completely intact with front bumper and body mounts) from my stock DS and installed it on the Tekin chassis—talk about a no-brainer. Next came the rear suspension and drive train, which were a little more tricky to install. To accommodate the midship-mounted motor, I had to flip the Stealth tranny around and mount it backward on the chassis. This required that I remove the top shaft from the tranny and reinstall it backward (the top shaft must exit the tranny on the right side of the car). I removed the idler and diff gears and flipped them around as well so that I would not disturb the gear mesh.

The Tekin chassis also includes an aluminum motor mount and molded rear shock tower, bulkhead and tranny brace. I installed them on the chassis according to the instructions. I *did* have to modify the rear shock tower because it was designed for Associated's longer off-road Team Shocks. As you know, the DS uses Associated's shorter .56-stroke shocks, so I had to drill new mounting holes in the shock tower. I didn't bother to install the Tekin Active Link suspension; instead, I mounted the stock DS suspension-arm mounts and rear suspension arms on the chassis. Because of the new mid-motor configuration, the stock rear swaybar did not fit. No problem: I later discovered that in this configuration, the car doesn't need a rear swaybar.

Next, I added the rear uprights (axle carriers), universal drive shafts and upper camber links without a hitch. The new bulkhead is mounted behind the tranny instead of in front of it. For this reason, I had to install one end of the upper camber links on the back of the rear uprights (the upper camber links are mounted in front of the rear uprights on the stock DS), and I mounted the other end of the camber links on the new bulkhead. I completed the conversion by installing the wheels and tires.

The car now has considerably more high-speed steering, and it's rock solid when exiting sharp corners under power.

A FEW MORE MODS

Of course, I couldn't just stop here. A ton of hop-ups are available for the Associated DS, so I decided to see what I could find.

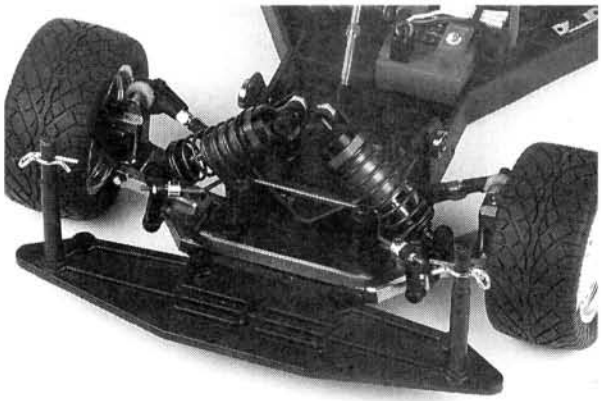
• **Front end.** I installed a complete blue-anodized aluminum front suspension from GPM. The front suspension arms, caster blocks and steering blocks are sold individually and have been expertly machined. Once the pieces had been installed, not a hint of slop was evident. I also replaced the stock steering system with a GPM blue-anodized aluminum steering bellcrank system to match the rest of the anodizing. The GPM steering bellcrank eliminates the servo-saver, so one must be installed on the steering servo.

The front shocks received MIP's* Golden Shock Shafts and Associated green (medium) springs and 40WT silicone shock fluid. I also installed Lunsford* titanium turnbuckles and hinge pins, which are available as a complete set for the Associated DS. The last hop-up up front was a complete set of Robinson Racing's* Sure Fit ball cups, which fit a little more tightly and work with less binding than the stock units.

• **Rear end.** I replaced the stock rear uprights with GPM anodized-aluminum pieces. I did this only for esthetics, of course: I wanted the rear end to match the front. Unfortunately, GPM's U.S. distributor, Hobby Etc.*, was out of the rear, blue-anodized aluminum suspension arms, but I plan to add them as soon as they're available. I installed MIP Golden Shock Shafts on the rear shocks, and I used 40WT shock fluid. Lunsford turnbuckles and hinge pins and Robinson Racing Sure Fit ball cups can be found back there, too. To eliminate some dead weight, I replaced all of the car's fasteners with a complete set of Associated blue-anodized aluminum screws and lightweight aluminum ball joints.

PHOTOS BY WALTER SIDAS

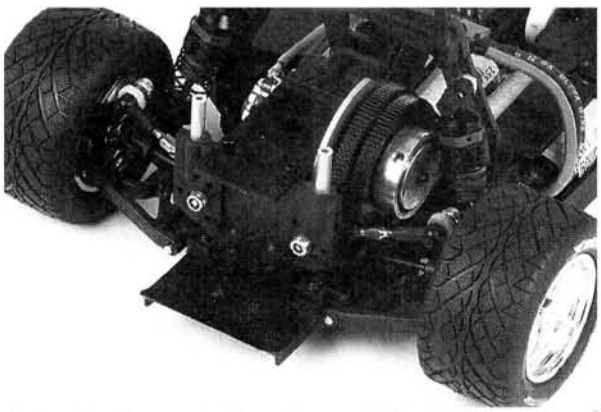
A MID



A complete GPM anodized aluminum-alloy front suspension makes this car bulletproof. Other mods include Associated green springs, MIP Gold shock shafts and Lunsford turnbuckles and hinge pins.

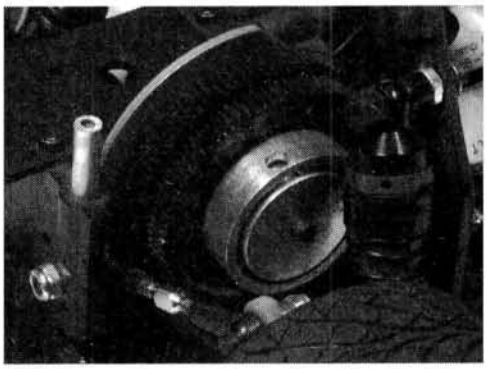
PARTS LIST

- Associated Green 1.4-inch front springs (medium)—part no. 6494.
- Associated blue-anodized aluminum screw set—NA.
- Associated G-compound rear tires—8896.
- Associated blue foam tire inserts (two)—8889.
- Associated BMW DTM body—6138.
- GPM anodized aluminum-alloy front-suspension arms—GPMDS55.
- GPM anodized aluminum-alloy front "C" hubs (0 degrees)—GPMDS20.
- GPM anodized aluminum-alloy front steering arms—GPMDS21.
- GPM anodized aluminum-alloy ball-bearing steering bellcrank—GPMDS47.
- GPM anodized aluminum-alloy rear hubs—GPMDS22.
- Airtronics CX2P 2-channel radio system.
- Airtronics 94157 high-speed servo.
- Tekin Active Link chassis (no longer available).
- TSC P-12 ESC.
- Tekin TFM-75 mini FM receiver.
- Peak Performance EBX 12-turn modified motor.
- Orion V-Max 1700mAh matched cells.
- HPI 2-speed transmission—8201.
- Lunsford titanium tie rod and hinge-pin set—PS65.
- Robinson Racing Sure Fit ball cups—RRP-2013.
- MIP Gold shock shafts—1115.
- RPM Dress Up wheel nuts (chrome)—8071.
- RPM Fatboy chrome sedan tailpipe—8121.
- Holeshot 2001 motor heat sink.
- Deans* Ultra plugs.
- Custom paint by Bich'n Bodies.

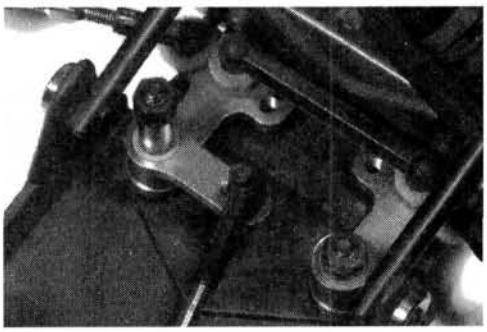


Notice that the rear bulkhead is mounted behind the gearbox instead of in front of it. GPM alloy axle carriers dress up the rear suspension. Lunsford tie rods and hinge pins reduce weight and increase strength. Associated's new G-compound rubber provides superior traction.

Check out the midship-mounted motor—very cool! The Holeshot motor heat sink helps dissipate motor heat. The motor's location causes a few space problems, so working on the motor and drive train is a little more time-consuming. Check out the shock tower—also part of the Tekin chassis.



HPI's 2-speed tranny adds excitement to the driving experience. Quick acceleration and impressive top speeds give the 2-speed DS an edge against the competition. As you can see, there isn't much room between the 2-speed clutch and the right shock absorber. Notice the aluminum motor mount; it was included with the Tekin chassis.



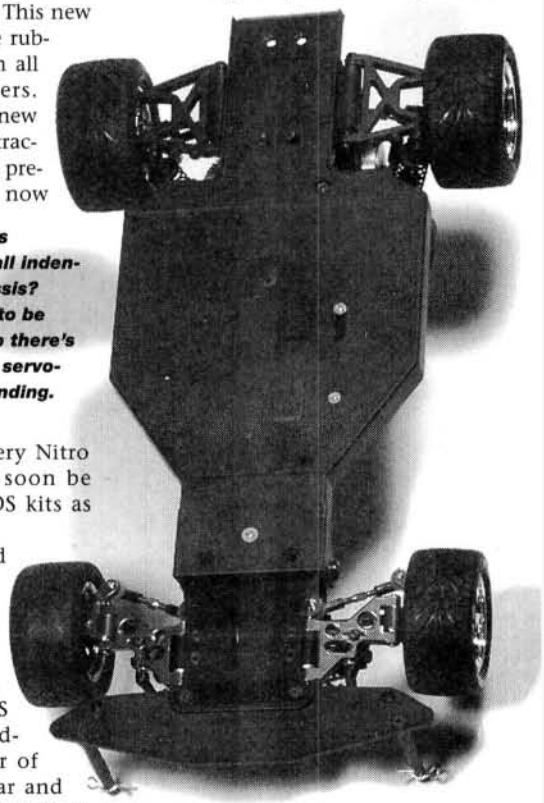
GPM's ball-bearing steering bellcrank matches the rest of the anodizing nicely. Notice the steering-servo placement and the long titanium tie rod.

SHIFTING INTO HIGH GEAR

The last, but certainly not the least important addition was an HPI* 2-speed tranny. If I were allowed to install only one hop-up on my DS, it would be this. I can't rave about 2-speed transmissions enough. They totally change the driving experience. The HPI 2-speed tranny is easy to add and works flawlessly. The shift point can be set wherever you want. You can set it to wind out the low gear before it shifts up to the high gear, or you can set it so that it shifts gears almost immediately. You get blazing off-the-line acceleration and lightning-fast top speeds with one of these babies.

ONLY NATURAL RUBBER WILL DO

Associated recently released new G-compound tires for the DS. This new material is far better than the rubber that is now included with all electric DS parking-lot racers. According to Associated, the new G compound provides more traction and lasts longer than the previous compound. Associated now includes these tires with every Nitro Dual Sport kit. They may soon be included with the electric DS kits as well.



The flip side of the DS Mid is as smooth as can be. See the small indentation in the center of the chassis? This allows the steering servo to be mounted flat on the chassis, so there's still enough room for the large servo-saver horns to pivot without binding.

Associated also released new blue foam tire inserts that are much firmer than the stock white foam inserts. Team the blue inserts with the G-compound rubber, and you'll have one surefooted DS on your hands. On my mid-motor DS, I installed a pair of G-compound tires in the rear and the original M2 compound up front (both front and rear tires have the new blue foam inserts). If you have a stock (rear-motor) DS, try the G-compound tires up front and M2-compound tires in the rear. You'll be very pleased with the results.

BICH'N BODY

My body of choice for my DS Mid is the Associated Trans Am Camaro. Although the chassis shown here has an Associated BMW DTM body, I always use the Camaro body when I drive the car. The BMW body provides tons of steering, which is just what the stock DS needs. Because of its midship motor configuration, my DS Mid has almost *too* much steering and requires a body that provides more rear downforce.

The BMW body shown on these pages features a custom paint job by Scot Bich from Bich'n Bodies*. I actually photographed the real First Union BMW that raced in the North American Touring Car Championships at Lime Rock, CT. I sent Scot a couple of snapshots of the car in action, and within a few weeks, I had the body you see here. For the record, the First Union logos are not decals; they were painted from the inside of the body. The Valvoline decals are from Autographics*, and the rest of the decals are from Associated. Scot also used Tru-Match/Realistic Racing Colors* paint. Unfortunately, I couldn't get my DS Mid to perform to my liking with this body, so I now use it strictly as a concours body.

Speaking of concours bodies, I also added a couple of items from RPM*. The first were the aptly named Dress Up Wheel Nuts. They're available in chrome or gold, and three styles come in each package (12 wheel nuts total). I used the chrome hex-shaped knock-offs, and they look really cool on the DS wheels. I also added one of RPM's Fatboy chrome sedan pipes on the rear end of my BMW DTM body. Currently, two pipes are available through RPM: the Fatboy, which is a thick single tailpipe, and the Slim Twinz, which has

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PROJECT DUAL SPORT

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two smaller pipes mounted together. The Dress Up wheel nuts and sedan pipes are inexpensive and easy to install, and they give your bodies that extra detail you've been looking for.

ROCKIN' ELECTRONICS

My trusty Airtronics* CX2P radio sends the signals to a Tekin TFM-75 mini FM receiver. An Airtronics 94157 high-speed servo keeps me in control, and an economically priced yet feature-packed Tekin TSC P-12 ESC manages the power. Expertly matched Orion* V-Max 1700mAh cells provide the juice, and the go power comes from a sick-fast Peak Performance* EBX 12-turn modified motor. I also installed a Holeshot* 2001 motor heat sink to help the motor run cooler.

PERFORMANCE

The moment I set this car on the track, I knew I had a winner on my hands. The car has blazing-fast off-the-line acceleration and a virtually endless top speed. Talk about having the best of both worlds!

My stock DS had a tendency to push. The converted car now has considerably more high-speed steering, and it's rock solid when exiting sharp corners under power. I did have to adjust the throttle end-point adjustment (EPA) on my radio so that the car received minimal braking. It has a tendency to swap ends if too much is applied. Once I had toned down the brakes, the car was completely dialed.

When I was comfortable with the car's handling and speed, I turned the radio over to our grand exalted leader, Frank Masi, so that he could evaluate the car's performance. He was amazed at how well it handled, and he admitted that this was one of the coolest—and most successful—projects he had ever seen. Hey, Frank isn't easily impressed, so his comments serve as a testament to the car's handling capabilities.

FINAL THOUGHTS

Although it is not our policy to tease our readers with products that are unavailable to the masses, this project was just too cool to pass up. Who knows? Maybe a mid-motor chassis for the Associated Dual Sport will become available in the near future. In the meantime, keep in mind that all of the hop-ups mentioned in this article will work equally well on a stock DS.

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

WHAT'S new

Trinity

Thunder Sport VIS EX-TRA Battery Pack

Here's a great pack for sport running. Every cell has been processed by Trinity's exclusive VIS EX-TRA system to increase its voltage output and *your* power and run times.

Part no.—RC5925; price—$29.99.

Trinity, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.

TAMIYA

Porsche Boxter

This new M-chassis from Tamiya is based on the M-02L chassis with a rear-mounted motor. The 52mm-diameter TA-chassis series wheels—used instead of the smaller, more usual M-chassis variety—are offset by 4mm and help the car go faster, especially in the straights. To accommodate these larger wheels, the gearing has been changed from the typical 20-tooth pinion to a 16-tooth pinion. The kit includes a 540-type motor, polycarbonate body, masking and a decal set.

Part no.—58197; price—$220.

Tamiya America, 2 Orion, Aliso Viejo, CA 92656-4200; (800) TAMIYA-A; fax (714) 362-2250.

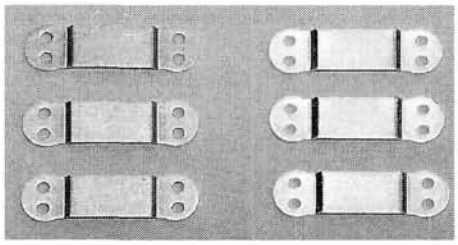
GM RACING

Battery Bars

Designed to provide more power with less resistance, these battery bars also make completed packs stronger. Available in both copper and silver plate, these bars are custom-fit for the new Sanyo 2000 cells, but may also be used with others.

Part nos. and prices—GM1280 (copper), $4.49/10, GM1281 (silver), $3.99/8.

GM Racing USA, 107 Russell Ave., Niles, OH 44446; (330) 544-9411; fax (330) 544-9416.



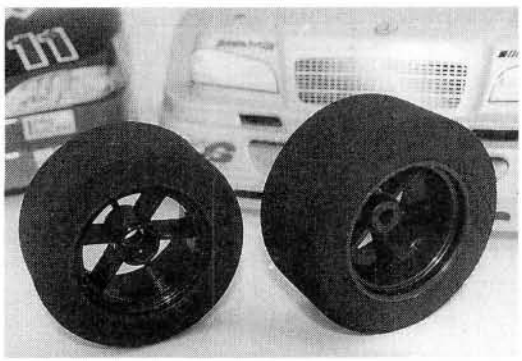
ASSOCIATED

Mounted Foam Tires for RC10 DS

Available for both the RC10 DS and RC10 Nitro DS, these high-traction, green-compound rears and black-compound fronts will give your DS a handling advantage on prepared asphalt and carpet tracks. They are pretrued to optimum racing height and mounted on Associated's scale-looking, black DS wheels. For racers who prefer to mount their own tires, the wheels and tires are also available separately.

Part nos. and prices—8888 (pair of mounted fronts), $10; 8898 (pair of mounted rears), $11; 8883 (front wheels to fit foam tires), $5; 8893 (rear wheels to fit foam tires), $5; 8130 (unmounted front foams), $6; 8131 (unmounted rear foams), $4.50.

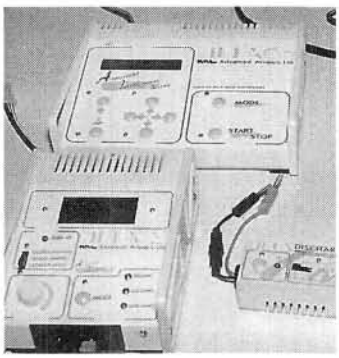
Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626; (714) 850-9342; fax (714) 850-1744.



MAGMA INTL.

Apex Infinite DC Charger/Discharge/Cycler

Great for your batteries, this unit (background) offers automatic cut-off with MOSFET, 8-bit 12MHz CPU, reverse-polarity protection, built-in cooling fan and recycling capability up to 99 times. It can charge one to 30 cells at a time and charge or discharge at 0.1 to 5 amps; it has a 16-character dot-matrix LCD and separate TX and RX output chargers.

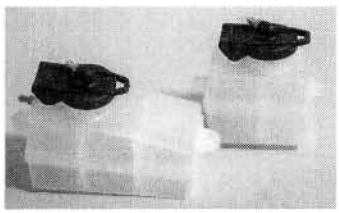


Part no.—MSRP US; price—$245.

Magma Intl. Ltd., 18 Crown Steel Dr., Unit 107, Markham, Ontario, Canada L3R 9X8; (905) 305-9753; fax (905) 305-9755.

SERPENT

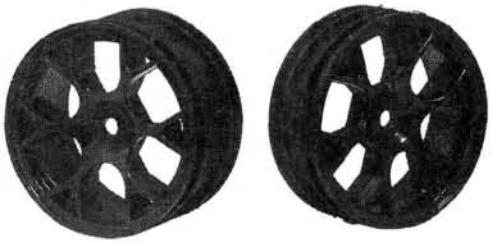
Fuel Tank Modifications



These unique tanks offer exact fuel capacity and less fuel movement. They also have a bronze filter to transport and filter fuel efficiently. In both tanks, the pressure nipple is part of the fuel cap—very convenient. The larger opening of the 75cc tank is sure to speed pit stops.

Part nos. and prices—1430 (125cc), $34.95; 8135 (75cc), $19.50.

Serpent Inc. USA, West Park Center, 2832 NW 79th Ave., Miami, FL 33122; (305) 639-9665; fax (305) 639-9658.



PRO-LINE

Warlock Narrow and Super-Narrow Sedan Wheels

Here's the latest high-performance accessory for Tamiya, HPI, Yokomo and Kyosho touring-car kits; available in narrow and super-narrow versions.

Part nos. and prices—narrow: 2618W (white), $5.95; 2618B (black), $5.95; 26118C (chrome), $8.95; super-narrow: 2622W (white), $5.95; 2622B (black,), $5.95; 2622C (chrome), $8.95.

Pro-Line, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

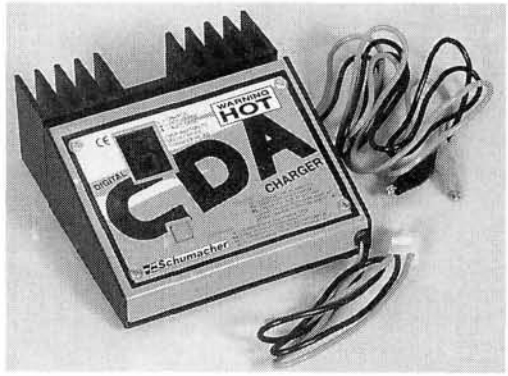
SCHUMACHER

CDA Charger/Discharger/Autotest

This charger/discharger combines all the best features of each individual unit. The charger function features: 4.5A reflex charging for maximum charge capacity; a special charge-boost system that keeps Ni-Cds ready for racing use after they've been charged; a display that shows peak voltage and charge input in amp/hours when charging has been completed. Discharger functions include a display that shows: discharge time in seconds at a 10A rate (to check gear ratio after every race); amp/hours left in a pack after it has been run (to check and compare pack capacity); and "punch factor" to monitor when your Ni-Cds are losing their punch. The auto-test function charges and/or discharges—depending on what is necessary—and displays the results with a single push of a button; advanced digital design for reliable, accurate results; a strong metal casing with large alloy heat sink; a 22mm high-intensity digital LED display; and an emergency cut-off timer system for safety.

Part no.—G831F; price—$179.95.

Schumacher Inc., 6302 Benjamin Rd., Ste. 404; Tampa, FL 33634; (813) 889-9691; fax (813) 889-9593.



BOLINK

'69 Dodge Charger—1/10- and 1/12-scale

This great classic body is available for your favorite 1/10- and 1/12-scale cars. The 1/10-scale version fits Bolink's Sport 2000 narrow Spec Racer and Fastruck, Associated RC10DS and all superspeedway cars; the smaller body will top off all 1/12-scale cars in style.

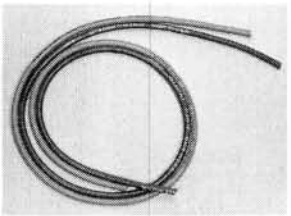
Part nos. and prices—BL-2257 (1/10-scale), 19.95; BL-2089 (1/12-scale), 11.95.

Bolink R/C Cars, 420 Hosea Rd., Lawrenceville, GA 30045; (770) 963-0252; fax (770) 963-7334.

W.S. DEANS

Wet Noodle

This new "soft flex" 12-gauge wire tubing—with a strand count of 1660—is ideal for "full race" applications. Made of high-grade copper and insulated with silicone, it ensures maximum power and minimum resistance.



Part nos. and prices—1410 (2 feet each of red and black), $6.95; 1430 (24 feet red), $39.95; 1431 (25 feet black), $39.95.

W.S. Deans Co., 7628 Jackson St., Paramount, CA 90723; (562) 634-9401; fax (562) 634-9403.

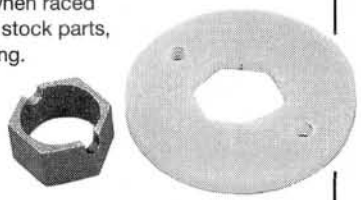
DURATRAX

Brake Accessories

These two high-performance, low-cost replacement brake parts will help improve your Associated gas truck's stopping power. The disk brake for the RC10GT is fiberglass, which is harder and therefore more durable than the stock brake material. The steel brake adapter replaces the RC10GT's stock plastic adapter. It does not melt or wear, even when raced hard. These parts can be used alone to replace stock parts, but used together, they provide maximum braking.

Part nos. and prices—DTXC2565 (disk brake), $3.99; DTXC2566 (brake adapter), $4.49.

DuraTrax; distributed by Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



Descriptions of the products shown here were taken from manufacturer and/or advertising agency press releases. The information given does not constitute an endorsement by Radio Control Car Action or guarantee product performance or safety. When contacting a manufacturer about any product described here, be sure to say you read about it in Radio Control Car Action. Manufacturers! To have your products mentioned here, send press releases to R/C Car Action, What's New, 100 East Ridge, Ridgefield, CT 06877-4606.

SERPENT VECTOR

(Continued from page 97)

crash, it could be difficult to change your line and avoid the carnage. The Vector felt very nimble, and if I wanted a little more or less steering, it was available instantly. It's a pleasure to drive in traffic, as you have so much control of it that you can take your time working your way around the other cars. If you're smooth, the car is awesome!

Although the Vector's settings are easy to change, I never ventured from the basic setup suggested by Serpent. The Vector is great straight out of the box. I like the way it handles so much that I didn't want to start playing with things!

For sheer thrills, it's awesome to have an R/C car that can go from zero to 60mph in a couple of seconds. The Vector is very, very fast and has rocket-like acceleration. The thrill of driving a car like this is very difficult to describe: going at full speed, the racetrack seems to narrow, and it is critical that you do everything—accelerate, brake, turn—at just the right spots. The brake is very smooth and has a nice, progressive feel.

If you've driven an on-road gas car before, you'll love the Vector's speed. If you haven't, I *strongly* recommend that you set the engine to run a little rich. The car won't be quite as fast, and you'll have an easier time getting used to the speed. Many on-road racers never learn that slower is faster. Just as with full-size car racing, you don't always run at full throttle. You must take the turns nice and tight, at the appropriate speed and smoothly. Drive the Vector in this way, and its speed and handling prowess could easily put you in the winners' circle!

FINAL THOUGHTS

This is a car that makes it very easy to do well. The Vector's suspension is extremely easy to set, and the settings rarely change (unless you hit something hard). The Serpent setup book provides initial settings for all the various adjustments, and when set up "by the book" the Vector will handle very well with minimum adjustment.

When your driving skills are good enough to take advantage of it, you'll be able to fine-tune the Vector to suit any kind of track. Thanks to the Vector's good basic design and Serpent's superb setup book, it's easy to look as if you really know what you're doing.

Though it isn't inexpensive, it's reasonably priced, and the replacement parts are readily available (something to be considered). With a winning record, excellent factory support and an Internet site (**http://www.serpent.nl**) that offers immediate help, what more could you ask for?

**Addresses are listed alphabetically in the Index of Manufacturers on page 224.* ■

ADVERTISER INDEX

INDEX OF MANUFACTURERS

ABC Hobby Co. Ltd.; distributed by *Sunrise R/C Ltd.*

Airtronics, 15311 Barranca Pky., Irvine, CA 92718; (714) 727-1474; fax (714) 727-1962.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; (714) 850-1744.

Autographics of California, 4620 New Horizon Blvd., Bakersfield, CA 93313; (805) 836-2886; fax (805) 836-0938.

Bich'n Bodies, 4903 Cloverfield Rd., Pearland, TX 77584; (281) 485-0375.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (770) 963-0252; fax (770) 963-7334.

BRP Inc., 1575 Lowell St., Elyria, OH 44035; (216) 284-0270; fax (216) 284-0271.

CRC; Calandra Racing Concepts, 6860 Stanwix Ave., Rome, NY 13440; phone and fax (315) 338-0867.

Cross Racing; distributed by GTP (see address below).

Deans Connectors, 7628 Jackson St., Paramount, CA 90723; (562) 634-9401.

Du-Bro Products, P.O. Box 815, Wauconda, IL 60084; (800) 848-9411; fax (847) 526-1604.

Fantom Racing, 50201 Silver St., Vicksburg, MI 49097; (616) 649-9583; fax (616) 649-9584.

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S.E.I. Racing, 14836 N.E. 31st. Cir., Redmond, WA 98052; (425) 556-9292.

Sky High RPAs, 8058 Laurel Ln., Denton, MD 21629; (410) 822-3732; fax (410) 822-9362; website: www.planes-wings-things.com; email: sky-hi@msn.com.

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Sunrise R/C Ltd., 1703 Utah Ct., Milton, WA 98354; (206) 838-8508; (206) 838-7603.

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Xipp Mfg.; Gene Kochiuba, 4201 Church Rd., Ste. 265, Laurel, NJ 08054; (609) 778-9477.

RADIO CONTROL CAR ACTION (ISSN 0886-1609, USPS 001-087) is published monthly by Air Age Inc., 100 East Ridge, Ridgefield, CT 06877-4606, USA. Periodical postage permit paid at Ridgefield, CT, and additional mailing offices.

SUBSCRIPTIONS. Call (800) 877-5169, or set your Web browser to http://www.airage.com/subscribe.html. U.S.: 1 year, $34.95; 2 years, $59.95. Canada: 1 year, $51.31; 2 years, $91.97 (Canadian prices include G.S.T.). Elsewhere: 1 year, $47.95; 2 years, $85.95. Canadian G.S.T. registration no. 13075 4872 RT.

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Chris's BACK LOT

Christmas wish list

Soon we will see kids standing around in insulated winter gear, their little hands grasping sled handles, their little eyes looking hopefully skyward for clouds whilst wishing ever so hard for the mercury to drop below freezing (you can't sled on slush). Then I'll know that the time has truly come for me to say something appropriate about the holiday season. Something that really gets to the spirit of Christmas, instead of all that materialistic commercialism that ruins the holidays. So here goes:

May your holiday season be one of serenity and family unity. AND OF COURSE, FILLED WITH TONS OF NEW R/C STUFF LIKE ... LIKE: SEDANS, BUGGIES, STADIUM TRUCKS, MONSTER TRUCKS, FREE-FLOWING SPEED CONTROLS, COMPUTER RADIOS AND—AND—AND HAND-WOUND MOTORS AND ITALIAN NITRO ENGINES, AND—AND—AND—AAAAAAHHHHHHHH!!

OK, I'm calm now.

Merry Christmas to all and to all a good NI-CAD! No no no! I-I-I mean, to all a good NITRO!!! No wait!! That's not right either ... AAAAAAAAAAHHHHHHHHH!!!!

This is my page—mine!

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. My Internet address is: chrisc@airage.com.